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TEACHING METHODOLOGY FOR BRAIN-INJURED AND HYPERACTIVE CHILDREN, A DEMONSTRATION-PILOT STUDY.
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AN INVESTIGATION WAS MADE OF THE EFFECTIVENESS AND VALUE OF A CONTROLLED CLASSROOM ENVIRONMENT, ESPECIALLY PREPARED MATERIALS, AND HIGHLY STRUCTURED TEACHING METHODS UPON LEARNING PROBLEMS AND SCHOOL ADJUSTMENT OF MENTALLY RETARDED, EMOTIONALLY DISTURBED CHILDREN, WITH OR WITHOUT CLINICALLY DIAGNOSED BRAIN INJURY. CHILDREN WHOSE EMOTIONAL DIFFICULTIES ARE CHARACTERIZED BY MENTAL RETARDATION AND HYPERACTIVE AGGRESSIVE BEHAVIOR AND CHILDREN WITH MENTAL RETARDATION AND KNOWN OR SUSPECTED BRAIN INJURY BETWEEN THE AGES OF 7 AND 11 YEARS WERE STUDIED. A THOROUGH CASE STUDY OF EACH CHILD WAS MADE. A CONTROL GROUP OF ENDOGENOUS CHILDREN AND HYPERACTIVE CHILDREN WITHOUT NEUROLOGICAL INDICATIONS OF BRAIN INJURY, TAUGHT BY CONVENTIONAL METHODS, WAS USED. THE TWO EXPERIMENTAL GROUPS WERE IN AN EDUCATIONAL SITUATION DESIGNED IN GENERAL ALONG THE LINES DESCRIBED BY STRAUSS AND LETHTINEN. EXPERIMENTAL GROUP ONE INCLUDED CHILDREN WITH CONCLUSIVE EVIDENCE OF BRAIN INJURY AND MENTAL RETARDATION AND CHILDREN WITH MENTAL RETARDATION AND HYPERACTIVE AGGRESSIVE BEHAVIOR WITHOUT EVIDENCE OF BRAIN DAMAGE. GROUP TWO INCLUDED CHILDREN WHOSE CASE HISTORIES AND BEHAVIOR ARE TYPICAL OF THE BRAIN INJURED, BUT WITHOUT NEUROLOGICAL INDICATIONS OF BRAIN INJURY, AND CHILDREN WITH MENTAL RETARDATION AND HYPERACTIVE AGGRESSIVE BEHAVIOR WITHOUT NEUROLOGICAL INDICATIONS OF BRAIN DAMAGE. ACHIEVEMENT IN LEARNING WAS DEMONSTRATED IN BOTH GROUPS. THE STUDY SHOWED, HOWEVER, STATISTICALLY SIGNIFICANT DIFFERENCES IN GAIN FOR THE EXPERIMENTAL GROUP. (GC)

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TEACHING METHODOLOGY FOR BRAIN INJURED AND HYPERACTIVE CHILDREN

A Demonstration-Pilot Study

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Concerning the authors of this monograph, Dr. William M. Cruickshank, Ph. D., is Professor of Education and Psychology, and Director of Education for Exceptional Children, School of Education, Syracuse University. He was Project Director of the Demonstration-Pilot Study.

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Mrs. Miriam Tannhauser was liaison between the study staff and the Montgomery County Board of Education where she served and continues to serve as Supervisor of Special Education.

W. M. C.

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CHAPTER I

THE EDUCATIONAL PROBLEM AND DESIGN

The education of children diagnosed as hyperactive in their behavior with or without the diagnosis of brain injury has been the source of serious concern and discussion among educators for more than two decades. The initial impetus to this phase of special education stems from the important research of Heinz Werner and Alfred A. Strauss (1) which was concerned primarily with the psychopathological characteristics of these children and from the resulting volume on educational methodology later authored by Strauss and his colleague, Laura A. Lehtinen (2). There is little question as to the importance of these contributions, for, in addition to being of value in their own right, the work of these authors has stimulated numerous other investigations of the psycho-educational problems of brain injured children. In turn, these have gone far to minimize the artificial barriers of the traditionsl medical classifications and have served to point up commonalities in psychological characteristics among some children diagnosed as cerebral palsied, epileptic, aphasic, those with exogenous mental retardation without motor disability, and, indeed, with hyperactive emotionally disturbed children without apparent specific or generalized neurological disturbance.

The research of Werner and Strauss has been subject to some legitimate criticism in spite of the importance of their work. Essentially this criticism has revolved around two factors i.e., the lack of statistical controls and the lack of rigorous control in the medical diagnosis. The most important of these criticisms is that of Sarason (3) who treats the research fairly and objectively in the light of its importance and in the limitations which have been above suggested. It is interesting, however, to note that recent research has in large measure supported the earlier findings of Strauss and Werner while at the same time exerting controls absent in some of the original research.

Masland, Sarason, and Gladwin, in this connection, state:

> The work of Strauss is perhaps the best example we have of the fruitfulness of an approach which is based on the integration of concepts in developmental neurology, diagnostic criteria of brain injury, and detailed program planning. Elsewhere one of us has criticized the logic and validity of some of the diagnostic criteria employed by Strauss. Although Goldenberg felt that these criticisms were somewhat severe, it should be noted that they lead to a conclusion identical to his own . . . . Although the validity of some of the diagnoses of minimal brain injury based on Strauss' criteria can be questioned, it should not be overlooked that Strauss' conceptions have given rise to ingenious educational procedures and an environmental structuring which undoubtedly have had positive therapeutic effects. It is likely that there are cases where one would feel that a diagnosis of minimal brain injury by Strauss' criteria was unwarranted but where the child's response to the program planned for him, while it cannot 'prove' the correctness of the diagnosis, certainly cannot be used as evidence against it. Unfortunately, we do not have the kind of detailed case reports which would allow one to gauge the frequency of this type of case. If we had such comprehensive case descriptions one could also get a better idea of the role of the 'therapeutic milieu' in producing behavioral changes regardless of the presence or absence of brain injury. For example, we obviously have been impressed with the educational techniques and over-all therapeutic approach described by Strauss and Lehtinen. But one cannot avoid raising the following question: To what extent would children with no brain injury but with severely disabling learning difficulties

> and/or behavior problems benefit from the kinds of programs adapted to the presumably peculiar needs of brain-injured children? Inasmuch as the brain-injured child can be assumed to be one who also manifests personality disturbances, it is likely that some of the positive changes which occur are due to amelioration of these disturbances. This, of course, is a problem in cases where there is more than minimal brain injury, e.g., the cerebral palsied child (4, pp. 366-367).

Dolphin (5), for example, in a pilot study utilizing two groups of matched pairs of 30 children each, one cerebral palsied, the other physically normal, found psychopathological characteristics in the cerebral palsied children similar to those observed by Strauss and Werner in their exogenous mentally retarded children. Dolphin controlled her data statistically, but was at that time (1948) unaware of the psychological variability which might exist in subclassifications of children with cerebral palsy. Hence, the 30 children in her cerebral palsy group varied insofar as medical classification is concerned. Further, it was observed that some of the physically normal children demonstrated characteristics similar to those of the cerebral palsy group of children, although this did not effect the statistical significance between groups. However, nothing was at that time done to ascertain the importance of those characteristics in the normal population which when they occurred in the cerebral palsy population were termed psychopathological.

Shaw (6) later submitted a group of idiopathic epileptic children and a control group of endogenous mentally retarded children to many of the same tests which Werner, Strauss, and Dolphin had used, and found less significance statistically between the two groups than had previously been anticipated. Controls of a statistical nature and also of medical classification were maintained by Shaw. His results pointed up the fact that within the large group of children with central nervous system impairments there were apparently some such children (his idiopathic epileptic population, for example) who functioned psychologically as normal children functioned.

The findings of Dolphin and Shaw prompted a further study of the psychological characteristics of children with cerebral palsy. This study by Cruickshank, Bice, and Wallen (7) utilized large homogeneous populations of athetoid and spastic cerebral palsy children and a control group of physically normal children. In an effort to offset the earlier criticisms of Werner and Strauss by Sarason, care was taken in this latter study to control for medical diagnosis, chronological age, mental age, intelligence quotient, presence or absence of speech, and statistically to obtain sufficiently large groups of subjects so that generalizations could be made. In general the study demonstrated statistically significant differences between athetoid and spastic groups of children and between the athetoid and spastic groups and the control group of normal children. However, it was observed that children in all three groups showed some characteristics of the psychopathology, in some degree related to chronological age, earlier reported by Werner and Strauss and their associates. While the spastic population deviated in the greatest extreme from the responses of the normal children, some normal children also showed deviations in figure-background relationship.

The essential conclusion which is reached from the series of research projects which have been described is that, while generalizations can be made about the psychological characteristics of children with central nervous system disorders, significant variability obtains within any particular group of such children. It has been stated that this group of children represents the epitome of the concept of individual differences, and this is certainly true. Within the group are those children who demonstrate in an extreme fashion all the characteristics of psychopathology. There are others who show certain characteristics in large degree while other factors are less obvious. Finally, there are other children with known central nervous system impairment who appear to demonstrate none of the classical characteristics of psychological impairment. The need for individual diagnosis and appraisal is immediately apparent whenever educational placement or planning for a given child is seriously considered.

The Psychological Characteristics

What are the psychological characteristics to which reference has been made above? These have been described so fully in the literature elsewhere (7, 8) that space will be devoted here only in the degree that reader orientation to this monograph can be obtained. Several distinct characteristics of psychopathology have been described in the literature pertaining to brain injured children. These have usually included the factors of:

1. distractibility,
2. motor disinhibition,
3. perseveration,
4. dissociation,
5. disturbance of figure-background relationship,
6. the absence of a well developed self-concept and body-image concept.

Difficulties with angulation, closure, compression, rotation, and other factors related specifically to children's productions on the Bender-Gestalt test have been reported by various writers. It is felt, however, that these latter factors are closely related to and indeed are undoubtedly an integral part of certain of the broader characteristics mentioned earlier. As a matter of fact, whereas six major characteristics of psychopathology have been listed, it appears that probably three of these are in large measure variations of the characteristic of distractibility and that perseveration may be the second major characteristics of brain injured children. The matter of self-concept and body image must be considered as a separate factor.

Distractibility

It is felt that the factor of distractibility is the chief characteristic of children with central nervous system disorders. While there is, of course, marked variability among the children, this trait is almost universally reported by investigators. Werner and Strauss (9) refer to this phenomenon as forced responsiveness to extraneous stimuli. Goldstein (10) calls it hyperactivity. Homberger (9) sees certain of his patients as being "stimulus bound," i.e., unable to refrain from reacting to environmental stimuli which are at the moment essentially unnecessary to adjustment. Kahn and Cohn (11) describe certain of their patients as possessed of a "drive" to respond to unessential stimuli. In general, these investigators are observing the same thing, i.e., an inability of the patient to control his attention to stimuli which are immediately significant to his adjustment, the inability of the patient to negatively adapt to unessential stimuli, and an apparent hyper-awareness of visual, auditory, and tactual stimuli within the perceptive field of the observer. The attention span of these children is thus exceedingly short. Attention is interferred with in certain children by the most minute and insignificant extraneous factors. The behavior observed by educators is not to be interpreted as willed misbehavior, but may, when adequate diagnosis is at hand, be understood in the light of an undetermined, but evident, lack of cortical control permitting prolonged attention to the task and negative adaptation to the unessential.

Distractibility as it is being described here has frequently been reported in the literature in controlled experimentation. Werner and Strauss report this characteristic as predominate in their populations of exogenous mentally retarded children without pronounced motor disability. Dolphin observed it in her population of cerebral palsied children. Shaw reported it in some degree with idiopathic epileptic children. Qualtere (12), Trippe (13), Norris (14), and Neely (15), with four other groups of cerebral palsy children, make reference to this factor in various ways. Cruickshank, Bice, and Wallen (7) in their large groups of athetoid and spastic cerebral palsy children make frequent references to distractibility as a factor in poor test performance of the two groups of children. Goldenberg (16), Morris Bender (17), and others likewise refer to distractibility as a major characteristic of psychopathology in their populations of both children and adults with some form of central nervous system disorder.

Motor Disinhibition

Motor disinhibition is defined as the failure of the child to refrain from response to any stimuli which produces a motor activity. This is definitely an aspect of distractibility which was described in previous paragraphs. Any object which can be pushed, pulled, twisted, folded, or bent, may elicit a motor response on the part of the child. Holes into which fingers can be poked, cracks in a desk top which can be traced with a pencil or a finger, doors on hinges, inkwell covers in old-fashioned desks, or locker handles in school corridors--all provide for the motor disinhibited child a stimulus which may require a response. Here again, however, individual differences are manifest. Some children will be observed to be distractible in terms of auditory, visual, or tactual cues, but will not manifest motor disinhibition. The converse may also be true. There is, however, little doubt but that the latter factor of motor disinhibition is related to the larger characteristic of distractibility.

Dissociation

Dissociation is herein defined as the inability of the child to conceptualize a totality, i.e., the inability to see things as a whole, as a unity, or as a Gestalt. Rather the child tends to respond to a stimulus in terms of parts or segments and has marked difficulty in bringing two or more parts together into a relationship to complete a whole.

It is hypothesized that this characteristic is also closely related to distractibility and hyperactivity. Many researchers have demonstrated the difficulty of different populations of brain injured children to complete simple abstract geometrical designs on a marble board, for example. An analysis of the marble board itself may indicate the reason for the dissociative tendencies which the children have demonstrated. The marble board originally used by Werner and Strauss (18) and later used by Goldenberg (19), Cruickshank (20), Dolphin (20), Shaw (21), and many others, is approximately 14 inches square. It is painted gray, and contains 10 rows of 10 holes each. On this surface of 100 holes, is constructed a design made of black marbles which the child is to copy on a second board of his own. Hence, in front of the child during the task are two boards, 200 holes, possibly 40 marbles on the stimulus board, and a box full of 40 or more marbles given the child to use on his own board. It is easy to see that within the task itself are several hundred extraneous stimuli to which a distractible child and perhaps characterized by motor disinhibition may respond. If such be the case, it is quite likely that a trait which can be characterized as dissociation will demonstrate itself on the marble boards because of the inability of the child to refrain from reacting to the extraneous stimuli within the test situation itself. Dissociation, however, as an entity, whether associated with distractibility or a separate clinical factor, has been demonstrated by numerous investigators with different clinical groups and in several sensory modalities to be an important factor in the adjustment and learning of the children herein under consideration.

Figure-Background Disturbance

The close relationship between distractibility and the figure-background phenomenon has been clearly demonstrated by Cruickshank, Bice, and Wallen (7) in their study of psychopathology in children with cerebral palsy. The figure-background disturbance is characterized by the tendency of some children to confuse the figures and the background, by other children to reverse background and figure, by still other children to be unable to see any difference whatsoever between figures and background. This has been demonstrated with the visual modality on tachistoscopic tests by Werner (22), Dolphin (23), Cruickshank (23), and others. It has been demonstrated in tactual sensation by Werner (22), Dolphin (24), Cruickshank, Bice, and Wallen (7). It can be observed through such tests as the tactual-motor tests of Werner, the Syracuse Visual Figure-Background test, and possibly even the Marble Board tests earlier mentioned. Werner has suggested clinical differences between exogenous and endogenous mentally handicapped boys in figure-background pathology on the Rorschach test (25), while many clinical psychologists employ white space responses on the Rorschach, among other things, as clinical evidence of possible brain disorder.

It is again suggested that the figure-background pathology may be related to the phenomenon of distractibility and forced responsiveness to extraneous stimuli. In all of the test situations mentioned above, particularly in the Rorschach, the tachistoscopic tests, and the tactual-motor tests, the background has contained a marked amount of stimuli. Cruickshank, Bice, and Wallen (7) observed significant differences in the ability of their groups to differentiate figures from background when the patients were blindfolded and asked to conceptualize one of the Bender-Gestalt figures tactually when it was embossed on a large board and embedded in a background of thumbtacks. The large number of thumbtacks in the background constituted extraneous stimuli to which the distractible child was forced to respond and to which he was unable negatively to adapt in favor of the tactually more prominent embossed figure. Similarly it could be argued that the Rorschach cards contain much more stimulating features in the edges pertinent to the white spaces and thus the child who is hyperactive visually may be attracted to these areas for his responses. Certainly this is the case as one analyzes the two dimensional techistoscopic tests used by Werner and by Dolphin and the three-dimensional modification of their tests as it appears in the Syracuse Visual Figure-Background Test developed by Cruickshank, Bice and Wallen (7).

It thus appears that motor disinhibition, dissociation, and figure-background pathology may be closely related to hyperactivity and distractibility and this latter factor has been herein so conceived. Such a conclusion may be of little importance in itself, but it has basic import in considering the total problem in the light of a learning situation for these children.

Perseveration

A fifth factor, perseveration, seems to be a more independent psychological factor, yet one which oftentimes characterizes children with central nervous system involvement. Perseveration is the inability of the individual to shift with ease from one psychological activity to another. Stated in another way, it is the apparent inertia of the organism which retards a shift from one stimulus situation to another and results in a prolonged aftereffect of a given stimulus to which the individual had made an adjustment. There is an overlap in time between a shift from an old situation to a new situation. Perseveration, as with many of the other characteristics which have been mentioned, is not restricted solely to children with central nervous system disorders. It is to be found as a characteristic of psychopathology in many clinical groups. Perseveration is, however, frequently to be observed in the former group of patients. It is difficult to see that perseveration is related to hyperactivity and distractibility, although Werner and Strauss on one occasion intimated that this might be possible.

Perseveration appears to be an independent psychological variable, the presence of which in a child may impede learning in as significant a way as can distractibility in all of its various forms. From experience, however, perseveration seems to be a much more difficult phenomenon to control in a classroom teaching situation than are other factors which have been mentioned.

Self-Concept and Body-Image Concept

Bender and Silver (26), among others, have pointed out that brain injured children oftentimes are characterized by inadequately developed concepts of the body image. This has also been found to be basic to the development of inadequate self-concepts on the part of brain injured children. The lack of development of body-image concepts or the immature development of such concepts in comparison to children of comparable age and ability is not in and of itself a separate psychopathological characteristic. Rather, it is the effect of the psychological factors which have been mentioned in earlier paragraphs. It is, however, hypothesized that until a child has developed a relatively good concept of the body image, his own self-concept will be significantly impaired and learning of all types will be significantly retarded. The achievement of a realistic body-image concept necessitates coordinated physical growth and sound emotional development, i.e., a generally secure person. As any of these facets of healthy growth are retarded for whatsoever reason, the individual's body image may be impaired and learning and adjustment retarded as a result.

Cruickshank (27) has suggested that the self-concepts of cerebral palsy children were frequently disturbed and that their drawings of the body image were significantly mutilated. It is herein suggested that children who are characterized by hyperactivity, dissociation, and other forms of psychopathology observed in hyperactive and brain injured children will never have had the opportunity to develop appropriate self-concepts nor to have come to a good understanding of their own body images. Until such time as this is achieved within relatively normal limits, learning of all types will be impaired. The evidences of insecurity which many of these children present to the careful observer are indicative of their lack of awareness of other human beings and their lack of well formulated self-concepts. Hyperactive children are frequently observed to hug and caress their teacher, to run their hands over the teacher's face or arms, to pinch, push, or otherwise physically handle the adult or other children. They appear to need to be constantly reminded that other persons are present. Their visual perception of themselves and of others is so impaired that they need a constant tactual reminder that others are around them. The development of wholesome self-concepts should be a major goal of educators and psychologists in working with these children.

The Population: A Frame of Reference

To achieve an adequate definition of the population herein being considered is indeed difficult. It is difficult for many reasons, but primarily becasue of the lack of unanimity among the members of the medical, psychiatric, and psychological professions as to the cause and nature of the disability involved. It is difficult because of the inaccessibility of the organ, the brain and upper brain stem, wherein disturbance is suspected. It is further difficult because of the lack of detailed understanding as to the nature and function of the brain itself, either in terms of its separate lobes or in terms of their interrelationship and their function as a totality.

In the present writing the authors and the members of the diagnostic team struggled for many hours to obtain a meeting of the minds regarding definitions. They were hindered by the stereotypes of the several professions and because of stereotypes in the literature which employ such terms as _brain injury_, _brain damage_, and _brain disorder_. The traditional medical classifications of cerebral palsy, aphasia, epilepsy, and others, and the literature pertaining to each, carry further implications for definitions as well as containing somewhat differing definitions.

The children about whom this monograph is concerned are those who are defined as hyperactive with or without diagnosis *of brain damage. Specific brain injury is difficult to delineate* in every instance. While neurological examination and pediatric history in over half the cases supported the fact that brain injury was undoubtedly present, the diagnostic team members were frequently reticent to state in concert that a brain injury or other form of central nervous system disorder did actually exist. The diagnostic and clinical data accumulated on the individual children, however, fell into a pattern or "clustering" which made it possible to describe the children in terms of behavioral and learning disorders. A group decision to include a child in the study was made on this basis.

Thus, children who demonstrated the presence of hyperactivity, dissociative tendencies, perseveration, figure-background reversals, angulation problems in combination or as separate psychological characteristics; children who indicated traditional organic characteristics in pattern and scatter analysis on intelligence tests; and children who demonstrated these characteristics in appropriate ways in pediatric examinations, in neurological, audiological, and psychiatric examinations as well as in the psychological examinations, were included in the group. Hyperactivity, in traditional terms, is considered oftentimes to include those children who are characterized by emotional disturbances and gross manifestations of behavior disorders. While some children of the population of the current study were also characterized by these factors, hyperactivity is herein defined to include much more subtile deviations in behavior and is more specifically considered to be related to matters of short attention span, visual and auditory distractibility, and disturbances in perception leading to dissociative tendencies. A careful examination of the reports of the diagnostic team members of the case studies included in Appendix A will impress the reader with the universality of these characteristics in this population of children. All of these characteristics have been observed in individuals with definitely diagnosed brain pathology. The case histories will indicate that many of the children present marked evidence of brain pathology in some form. In other instances, while psychopathology is evident, specific evidence of brain pathology is neurologically absent. As, however, it will be noted later, certain children were intentionally included in this population who did not demonstrate any evidence of brain injury, but who were hyperactive within the limits of the definition and who did present evidence of psychopathology. From the point of view of behavior, these latter children were indistinguishable from those wherein the presence of brain injury was more clearly evident.

All of the children had first been brought to the attention of school authorities because they constituted classroom management problems. Several of the children were undoubtedly candidates for exclusion from the public schools because of their inability to adjust to the typical school situation. The subsequent examinations which these children received demonstrated in many instances subtile psychological reasons for their deviant behavior which would not have been otherwise understood. This dramatically points up an important new direction for public schools in their attempt to meet the needs of children. It is not enough that school personnel believe in the concept of individual differences. Profession of a belief necessitates implementation. Implementation with this particular segment of the school population, apparently much larger than is anticipated, requires a full complement of clinical personnel capable of evaluating subtile psychological and behavioral changes which may have their etiology in central nervous system disorders. Frequently these children present no observable deviations other than emotional maladjustment. This is usually coupled by a failure to respond to good teaching situations. There will usually be no motor disability as with cerebral palsy children. There is often no mental retardation, or if it is present it may be an artifact produced in the psychological examination situation by the same factors, which limit or entirely restrict school achievement. There may be no speech involvement such as in aphasia, although there may be a noticeable lag insofar as speech and language development is concerned. Oftentimes one gets the impression of a serious development lag on all measurements as being the most characteristic subjective observation of these children.

However, when subjected to understanding clinical appraisal by the psychologist, the neurologist, the pediatrician, and other members of an adequate diagnostic team, sufficient reason for the developmental lag in these children will become immediately apparent. When appropriate information of a clinical nature is available, the schools are then in a position to implement a program appropriate to the peculiarities demonstrated in the child. It is the thesis of this monograph that it is possible through thoughtful educational planning to devise within the framework of public education a method or methods of compensating for each and every psychopathological characteristic presented by the child and to thus facilitate positive social and academic growth. This cannot, however, be done without a complete understanding of the subtile nuances of behavior which characterize these children. Examples of the fullness required to obtain the necessary understanding are to be found in Appendix A, but even in the case studies included therein, the thoughtful reader will perceive serious omissions in the clinical data. More information is desirable; less, is intolerable for adequate implementation of the concept of meeting children's needs.

More and more educators are becoming more alert to the importance of minor deviations in child adjustment. These deviations from normal development are viewed as symptomatic of disorders of the integrative system affecting growth and maturation. The resulting unevenness in the child's development quickly brings him into conflict with the organizational pattern of the school system. Children characterized by a developmental lag do not really fit into the neat scheme of annual promotion, standardized grading, and other normative practices typical of public and private schools. The failure of these children to adapt to the standards of a child society, their failure to reach integrative standards typical of their chronological age and mental ability, and their failure to achieve and to learn in keeping with their intelligence level, points to the need for different educational practices. Such a different educational practice must not be conceived in terms of remediation, in terms of reduction of standards, in terms of repetition and drill, or even in terms of greater emphasis on manual skills. Failure of these children to achieve in the regular grades cannot be viewed by the teacher as a failure on her part. A different educational practice must be conceived of individually for the child in the light of the particular psychopathology demonstrated by him and in terms of new teaching which is geared to the unusual and unique characteristics which he illustrates. Since psychopathology is organically based in a central nervous system disorder, the factors etiological to maladjustment cannot be removed, hence, the educational program must be one which works with the psychopathological characteristic and exploits it to the advantage and the growth of the child. When this can be achieved, the schools can legitimately say that they are meeting the needs of these children. Until that time, this plank in the educational platform becomes nothing more than a cliché.

The Process of Learning: A Theoretical Viewpoint

In order to appreciate the problem which the young hyperactive child faces, one must put himslf momentarily in the place of the child. Learning and adjustment are essentially problems of perceiving and conditioning. It has been demonstrated many times that children with central nervous system disorders oftentimes, not universally, evidence pathology of perception. Perceptive problems have been demonstrated in the field of visual perception and the subsequent interpretation of visual impressions into motor ability. Copying a design with marbles from one marble board to another is not basically dissimilar to the request of a teacher to a child to copy a word or problem from the blackboard at the front of the classroom to the paper on the child's desk. Werner and Bowers (28) and much later, Norris (14) and Hunt and Patterson (29) have indicated that in various populations auditory perception also may be impaired. If there is an impairment in audio-motor performance, this may closely relate to the child's ability to write spelling words dictated by the teacher, to respond to auditory stimuli in the nature of pure tones in the audiological examination, to accurately sing tones which he has heard played for him on the piano, or to perform in accordance with his age and ability on other tasks which require motor interpretation of auditory stimuli. In similar manner tactual-motor deficiencies have been demonstrated in these children and in similar manner are corollaries to the laboratory experimentation to be observed in the daily activities of the schoolroom. The applied research of the psychological laboratory does have meaning to the educator.

Learning is conditioning. Conditioning takes place most advantageously under conditions of success. Children with perceptive disorders have predominately had failure experiences in the school situation. Guthrie speaks of " . . . the modification of behavior following . . . experience" (30, p. 22) as being the basis of positive growth and development. Positive growth and development, however, is premised on the ability of the child to perceive things in the same way or in generally the same way as do other individuals in the same culture. Many children with a central nervous system disorder who also show evidence of psychopathology will not perceive life situations in the same way as do normal children. Thus, their response to a given stimuli or situation will not be the same as that of the normally perceiving child. Conditioning will take place under such situations, but it will be learning which is counter to the standards of society for the age of the child. His learning is looked upon as misbehavior by the teacher, by the parents, or by neighbors. As one observes these children in a typical classroom situation, one is impressed by the few times during the course of a given day when the teacher can genuinely compliment the brain injured or hyperactive child for a job well done. The child rarely has a genuine success experience.

Conditioning implies that a "combination of stimuli which has accompanied a movement will on its recurrence tend to be followed by the movement" (30, p. 26). Most learning in children is positive in terms of school achievement and social growth, because the response inherent in a given stimuli has been appropriately perceived and has been accompanied by praise and a feeling of value on the part of the child. Learning and growth in the hyperactive child will be disorganized and disintegrated because, due to distractibility, responses deemed socially appropriate to given stimuli are not perceived. Both the stimuli perceived and the responses made are the result of change as well as unplanned trial and error behavior. Since the odds are small that the child will by chance produce the socially correct response to a given stimuli or series of stimuli, the chances that his behavior will produce positive social rewards is exceedingly small. Inappropriate responses, however, bring some rewards even though these may be negative. Since the environmental situation does not change and since the organic condition producing psychopathology in perception does not change or changes only slowly, if at all, the trial and error behavior continues and the child soon comes to learn that his rewards are going to be in the nature of failure and often punitive. Since the stimuli present as the initial response occurred are the future cues for the response, a vicious circle is almost immediately established for the deviant child within the normal social culture in which he lives. As age increases and emotional disintegration continues,maladjustment of the child becomes more and more apparent to those with whom he lives.

The Educational Program

In consideration of the characteristics of psychopathology which have been delineated and in terms of factors essential in conditioning, an educational program has been devised. The essentials of this program were described by Strauss and Lehtinen and employed by them in the period around 1940, at the Wayne County Training School in Northville, Michigan, and subsequently at the Cove School in Racine, Wisconsin. The present writers have 1) modified the procedures of Strauss and Lehtinen to some degree and 2) have herein attempted to establish an initially controlled study to evaluate

attempted to el effectiveness of the procedures which have been

the practical effectiveness of the procedures which have been described.

The psychopathology inherent in the child cannot be removed at least in terms of educational efficiency. This is true due to the fact that 1) the psychological problems are inherent in damaged tissue somewhere in the vital areas of the central nervous system, or 2) due to the fact that they are functional manifestations of a complex emotional problem (which in itself is physical) and which only can be modified at too slow a rate to insure satisfactory educational and social growth. Secondly, the educational program planned for normal children is in large measure completely unsatisfactory for the group of children herein under discussion. If then the disability cannot be removed and if the educational environment is unsatisfactory, there remains only the solution of creating another educational environment which takes into consideration the child's psychopathology and within such an environment to teach directly to the disability.

It is hypothesized that four elements comprise the basic essentials for a good teaching environment for brain injured children with hyperactivity and hyperactive children whose disturbance may solely be resultant from emotional maladjustment. These four factors are:

1. reduction in environmental stimuli,
2. reduction in space,
3. a structured school program and life plan,

3. a structured school program and life plan,

4. an increase in the stimulus value of the teaching materials themselves and teaching materials constructed with specific characteristics of psychopathology being considered.

In addition to the above mentioned four factors, it is assumed that an adequately prepared teacher is in charge of the classroom and that she has sufficient and appropriate teaching materials with which to carry out the designated program. This and other factors, such as understanding administrators, cannot be stressed too much and will be discussed at some length in chapters which follow. For the present only, the four essential features mentioned above will be considered.

Reduction in Environmental Stimuli

It has been indicated that the children herein under consideration are frequently characterized by marked and abnormal distractibility; that they are unable to refrain from reacting to unessential stimuli, and that basically they are unable to negatively adapt to environmental stimuli unnecessary to the specific adjustive task at hand. The reader is reminded of the best possible classroom which could be imagined for a typical class of second grade children. Such a classroom would be filled with all types of motivational materials, i.e., stimuli, which for the normal child are important factors in learning. Science corners, transportation corners, library corners, live pets, seasonal decorations on windows, bulletin boards full of appropriate features, pictures, growing plants, and frequently, beautifully decorated walls characterize the modern classroom.

priate features, pictures, growing plants, and frequently, beautifully decorated walls characterize the modern classroom.

Open shelves are filled with books and teaching materials. Blackboards contain written material often held from one lesson to the next. Both children's and teachers' desks are filled with much visible educational materials. Into this richly stimulating room, exceedingly appropriate for normal children without perceptual problems, are sent from between 20 and 40 children and their teacher. Each child is individually dressed in brightly colored clothes and these constitute additional stimuli to the other children. Color and the physical movement of the children and the teacher as they move around the room involve continual visual stimuli. In addition, auditory stimuli in the nature of hall noises, intercommunication systems, pencil sharpeners, and movement of the children complete a stimuli picture of the normal, but nevertheless excellent, second grade.

The normal child can learn in this rich and highly varied environment. He can respond appropriately to appropriate motivational stimuli at appropriate times. He can do this because he can negatively adapt to or ignore stimuli inappropriate to the specific learning at hand. Most teachers can appreciate the inability of the normal child to adapt negatively as at the end of a school day he becomes tired he and some of his friends become management problems and begin to react to things in the classroom which are not related to the learning situation then being considered.

What, however, for the normal child is appropriate, is completely inappropriate for the hyperactive or distractible child, who, because of an apparent lack of cortical control, is unable to adapt negatively or to refrain from reacting to the unessential stimuli in the classroom. The library corner, the movement of pets, the colors in the room, the auditory stimuli, all, it is hypothesized, constitute hurdles to satisfactory achievement and learning for this child. If what has been described is true, it then follows that a learning environment appropriate to the distractible child is one in which extraneous and unessential stimuli are reduced to a minimum.

In keeping with this statement it is suggested that one feature of an appropriate learning environment for distractible children is a classroom as devoid of stimuli as follows. It is thus recommended that walls, woodwork, and furniture be painted as nearly as possible a color matching the floor; that windows be made opaque; that bulletin boards and pictures be removed; that intercommunication systems be disconnected and pencil sharpeners be removed; that ceilings and walls near halls be sound treated so as to reflect external noises; that all furniture be removed except that absolutely essential to the teaching program; and that the number of children be significantly reduced from what is normally registered in an elementary classroom. The concept of reduction of environmental stimuli must be seriously considered and every possible unessential stimulus in the classroom be removed or be reduced in its visual, auditory, or tactual impressiveness. If the learning environment can be devoid of unessential stimuli, other things being equal, the hyperactive child has an increased opportunity to attend for necessary periods of time to those stimuli which are essential to his learning and achievement. He is thus placed in a position where socially positive conditioning is likely to take place.

Reduction in Space

As space increases, the number of stimuli in that space also increases. The contrary is also assumed to be true, namely, that as space decreases so the number of stimuli is reduced. It has been stated above that hyperactive children with a limited attention span find it difficult, if not impossible, to refrain from reacting to stimuli. As a part of the problem of reduction of stimuli, space in which the learning activities of hyperactive children take place should also be reduced in size to the smallest practicable area. It is hypothesized that this size is that required for the child's desk and chair. It is thus recommended that cubicles approximately 3 feet wide and 3 feet deep be constructed for each child. The walls of the cubicles should be painted the same color as other structures in the room and they should be solid to the floor and approximately 7 feet high. The cubicle will be three-sided and open on the fourth side. The child's desk will be at the back wall with the child facing away from the open side. The two side walls will be constructed so as to terminate about 6 to 8 inches beyond the child's back when he is seated at this desk to obviate distraction which may otherwise come to the child peripherally from the adjoining cubicles. The desk will be permanently fixed to the cubicle walls to minimize motor disinhibition. No teaching materials will be kept in the child's desk. No pictures or other items will be on the walls of the child's cubicle. Until such time as the child has, through conditioning, learned to attend, all of his learning experiences in school will take place in this remarkably stimulus-free space.

Under optimum conditions a room smaller than the typical standard classroom would probably be most appropriate for the hyperactive child. In the event that such is utilized, adjoining storage space must be available for teacher use.

Insofar as the learning environment is concerned, there has thus far been achieved a non-stimulating space in which the insertion of stimuli can be carefully controlled. Such controls should include the number of visitors admitted to the classroom as well as the enclosure of all cupboards and closets. In the largest sense a self-contained classroom has been achieved. An environment so devoid of unessential stimuli has been developed that the hyperactive child can for one of the first times in his educational experience attend to the essential stimulus for a sufficiently long period of time without interruption so as to achieve a success experience, i.e., to effect a socially positive conditioning.

A Structured School Program and Life Plan

It is the thesis of this monograph that many hyperactive children (with or without diagnosed brain damage) have been unable to attend to appropriate stimuli for a sufficiently long period of time to comprehend their meaning and to have a genuine success experience in terms of socially approved activities. Their lives have been filled with failure experiences which are based on trial and error reactions and confused responses to unessential stimuli in the immediate environment. This behavior is frequently misunderstood by parents, teachers, and others to the degree that the child is perceived as a behavior and management problem. Certainly, deviant behavior is apparent in terms of classroom and home standards. The behavior is not willed, however, but is the purposeless response to random stimuli. The child experiences failure and discipline which adds further to the frustration which he may sense.

It is hypothesized that, if the learning environment can be simplified and highly structured, the hyperactive child will have greater opportunity for success experience, i.e., for positive conditioning. Hence, it is proposed that initially the educational program of the school day be completely teacher directed with little or no opportunity for choice on the part of the child. Such a decision implies that the teacher will be fully capable of meeting the child's needs within such a restricted environment and that the teacher will have available to her the complete data regarding achievement levels and ability of the child in terms of all activities which may be planned by the teacher for the child.

Specifically, what is meant by a structured program? By example, the authors mean that the child upon coming into the classroom will hang his hat and coat on a given hook; not on any hook of his choice, but on a specific hook and will follow this procedure from day to day. He will place his lunch box, if he brings one, on a specific shelf each day. He will then go to his cubicle and take his seat and from that point on follow the instructions of the teacher throughout the course of the day in terms of learning tasks, use of toilet, luncheon activities, and all other experiences until the close of the school day. The day's program will be so completely simplified and so devoid of choice (conflict) situations that the possibility of failure experience will be almost completely minimized. The learning tasks will be within the learning capacity and within the limits of frustration and attention span of the child. This will mean that a careful study of the child's attention span will have to be made. If it is determined that he had an attention span of 4 minutes, then all teaching tasks should be restricted to 4 minutes.

This procedure will be followed until such time as the teacher or others observe that the child is functioning with success in most of his activities, i.e., hanging up his coat, sitting at his desk, raising his hand, complying with the rules of the classroom, maintaining appropriate habits at lunch, achieving in abstract learning, and other elements essential to approved social participation and intelligent conformity. At this juncture the teacher may begin to present the child with choice opportunities. "Do you wish to eat your lunch today in your cubicle, as you have been doing, or would you care to eat lunch with John and me at a table near the window?" "You may hang your coat and hat on any of these unused hooks today. Which do you chose?" If the teacher senses tension on the part of the child in terms of these simple choice situations, she should continue the structured program for a while longer.

Mention was previously made that in this type of teaching class size will have to be restricted. The optimum class size has never been scientifically determined and undoubtedly depends in large measure on the degree of hyperactivity of the children to be included. It is recommended, however, whatever the size, that the procedures in initially organizing the class be carefully structured. To bring 8 or 10 hyperactive children into the classroom on the same day is to court disaster, for each of the children will bring his own pattern of misdirected behavior and background of failure into the school. The total situation is too complex for the majority of these hyperactive children. It also violates the concept of structure now under consideration. The presence of other children and a teacher in the classroom presents too many choice situations for a given child in the initial days of the school experience.

It is recommended that the teacher in the weeks prior to the beginning of the school year, visit the children in their individual homes and become acquainted with them, make a careful study of the diagnostic team data, and, possibly in conference with the supervisor of special education or appropriate psychological personnel, come to a decision as to which single child she desires to have come to school on the first day. The teacher will then work with this child until the latter is well adjusted to the school room, to herself, and to the routine which has been established. This may take several days before the teacher decides that a second child should now join the group and before she decides which child will be selected. This procedure is to be followed until the entire class roster has been assimilated into the group. In this fashion the teacher is able to observe that at no time is the adjustment of the group being impaired by reason of the situation becoming too complex. In the event the teacher finds that she has moved too rapidly in the admission of children to the group, temporary exclusion of one or more children may be utilized to reduce the complexity and to continue to insure success experiences for those children who remain in the classroom. Assuming that this procedure started in early September with the opening of the school year, it may take as long as the latter part of October or early November before the group is intact and operating together. Public relations with the families of those children not yet admitted is, of course, the responsibility of the school administration. Experience has demonstrated, however, that this does not constitute a major hurdle to program success.

The major consideration in terms of structure is to keep all activities including the total social organization of the classroom within the limits of tolerance or within the level of success of the children, both as individuals and as a group. Alone, this factor is not sufficient, but in combination with reduction in stimuli and space and in terms of the remaining consideration for the teaching materials, a situation will be created which may specifically meet the peculiar psychopathological needs of the children concerned and which may make acceptable learning and adjustment more nearly possible.

Increase Stimulus Value of the Teaching Materials

It is hypothesized that if hyperactive children are distracted to stimuli, their attention will be drawn to stimuli which are purposely organized and specifically placed within the visual field of the child. It follows then that if the stimulus value of the teaching materials is increased the child is more likely to direct his attention to those materials than if the typical teaching materials are utilized. The goal is to provide a learning situation so stimulating that the child's attention will be drawn to the task for a sufficient period of time to permit a positive conditioning to be effected. Hence, the teacher in preparing reading materials will utilize many colors in the letters comprising each word or in the numbers comprising a problem to be solved. The word, "dog," for example, can be increased threefold in stimulus value if different sizes, shapes, and colors are used in the three letters comprising the word. Preacademic skills will be developed through the use of intensely colored blocks, form boards, peg boards, and other similar material. The teaching material must be appropriate in difficulty level to the child's achievement level, but must be intensified in terms of its visual or tactual value. Once an appropriate reaction to a specific learning task has been completely achieved, it is possible to begin a transference to less stimulating materials and ultimately to bring the child to typical books, workbooks, or teacher-made instructional materials. It is important to note that it may be necessary to present single highly stimulating items to the child at a time. This may mean a single word on a card, a single sentence on a paper, a single arithmetic problem on a page. The desk top will be free of all other materials stimuli except those necessary to the specific task at hand. All unnecessary materials will be removed from the desk and placed in enclosed cupboards or out of sight of the child.

Mention was made above of the problem of adjusting in space. Frequently hyperactive children will be helped to attend to the specific area of the desk on which an arithmetic problem, for example, is placed, if the undifferentiated space of the desk top is restricted. The visual field can be restricted by placing a brilliant piece of construction paper or blotter paper under the book, paper, form board, or other materials to be used by the child. The brilliant color not only assists in restricting the visual field, but also simultaneously helps the child to direct his attention to the task at hand.

The reader will observe that the elements which have been discussed in the preceding paragraphs are in concert conceived to offset the impact of hyperactivity in the hyperactive child. Once again it is stated that the factors causing hyperactivity cannot be removed. It is possible through success experiences and conditioning for the child to learn. In keeping with the standards of society and through successful learning and social adjustment he can also learn to tolerate more effectively the more highly stimulating environments of so-called typical classrooms, playgrounds, or home environments.

The factors which have been discussed, however, are not in and of themselves the sole solution to all of the problems of psychopathology which may be observed in individual brain injured or hyperactive emotionally disturbed children. The items which have been discussed are basic, but at the same time consideration must be given to the development of teaching materials and environmental modifications which take into consideration such factors as dissociation, figure-ground disturbance, and motor disinhibition. If it is true that these latter factors are aspects of distractibility, then what has been outlined is also appropriate for them. Other modifications can be made, however, which will permit the teacher to teach more directly to these disabilities. These will be discussed more fully in Chapter V, wherein the specific teaching techniques will be outlined. Similarly, for the second major psychological disorder, i.e., perseveration, considerations can be made which will also immeasurably assist the child and will lessen the impact of this factor on learning and adjustment.

The Setting and Research Design

The purpose of this section is to outline the factual concrete aspects of the setting, and the research design. Where pertinent, the administrative and theoretical problems will be mentioned which were associated with the conducting of a pilot study in a public school system when it involves the psychological, medical, and social sciences in addition to education.

It is safe to say that were it the purpose of this monograph to report the results of an experiment conducted, for example, in physics or chemistry, the general acceptance of an already established body of proven facts and theory, would delimit the need to report in detail, professional viewpoints, specific information concerning the environmental setting in which the experiment was conducted, and conflicting interpretations of the results of the experiment. In the psychological, medical, and social sciences relating to the present problem, however, no such proven body of facts and theories has been established as it has in the physical sciences. Diethelm, in commenting on this fact cogently observes that ". . . no where is bias more marked than in the behavioral sciences. The personal psychodynamics of the individual will influence him, theories will affect his way of looking at the facts, his selection of special data, and his differentiation of the essential from the non-essential . . . . None of us are able to avoid bias, but by keeping this possibility in mind we will succeed in being constructively self-critical and avoid the danger of building fortifying systems" (32, pp. 149-150).

In connection with these remarks, it is appropriate to comment briefly upon the implications of various research methods. If one thinks of research design in terms of levels of rigourousness and control of variables, then among the simplest forms of inquiry are the survey and the pilot study. The survey is a method by which pertinent information and data are identified and collected about a general problem area, and the pilot study is a method of exploring an aspect of the problem area under relatively controlled conditions. It is not unusual, for example, for pilot studies to develop out of research problems which are identified, defined, or delineated as a result of a survey.

These two exploratory research methodologies appear to be particularly well suited to interdisciplinary research in the problem area of emotional disorders and learning difficulties among children about which there is so little known and around which there are so many conflicting theories. This statement does not mean to imply that the more rigorous forms of research methodology utilized in experiments and investigations are incompatible with acquiring basic information about human behavior, but only that these methods are perhaps more productive, more easily manipulated, and better controlled when conducted within the framework of one particular discipline.

Within this frame of reference, for example, it was appropriate that a pilot study such as this one (which presumed to explore the userulness of a specific type of instructional program devised for children with brain injury to children without brain injury) would, as a matter of course, seek to provide a means by which the existence of brain injury could be identified. Thus, although it was not the purpose of the diagnostic staff to determine what brain injury is, to isolate the various etiologies, or resolve the complicated neurological and medical problems of differential diagnosis associated with the concept of brain injury. It was their business to decide as a medical staff when and if gross brain injury existed. Finding the answers to the other problems may well be with the province of carefully controlled long range experimental problems in basic research initiated by those disciplines directly concerned with the structure and physiology of the central nervous system.

These general remarks would be incomplete if some comment were not made which recognizes the importance of the setting in which this research was conducted. One only needs to call

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attention to the vast number of variables which exist in a public school classroom setting to realize the difficulties one would encounter in attempting to conduct a classic experiment in basic research. The following section describes in considerable detail the background from which the current pilot study developed and the setting in which it was conducted. The purpose of including this information is to illustrate a basic fact of considerable importance, that is, that the setting in which educational research is conducted is most appropriate with the philosophy and needs of the public school program.

The Background and Setting

In Montgomery County, Maryland, the public school administrative personnel had, for some time, been keenly aware of the need to explore the basic causes of the learning difficulties of children whose behavior was such that they were not responding satisfactorily to existing methods of classroom management, instructional programs, or classroom assignments. Some of these children had been excluded from the school system and others were eligible for exclusion. Under Maryland State Law (33), children whose educational needs are not met by existing school services are eligible for State aid when transferred to private schools and treatment centers where there are programs more in line with the children's needs. It was, therefore, of immediate importance that the educational needs of these children be, in some way, met.

A second factor in the setting which contributed to the success of the project was the experimental nature of the educational philosophy of the Board of Education. For a period of approximately 5 years prior to the initiation of the pilot project, the Supervisor of Special Education and her teaching staff had explored a wide variety of classroom environments, teaching methods, instructional devices and principles of classroom grouping with particular references to the educational, emotional, and social needs of children known to have disorders of the central nervous system. She had also employed the same exploratory procedures with emotionally disturbed children whose learning difficulties were customarily associated with an aggressive acting out, hyperactive behavior response pattern.

Classroom grouping and instructional techniques for the children with central nervous system disorders had been worked out to the satisfaction of the children, parents, and the Supervisor of Special Education. Such was not the case with the non-brain injured children who may be descriptively referred to as hyperactive, underachieving, and emotionally disturbed.

Toward the close of the fifth year of informal classroom experimentation, it became evident that the learning disabilities and behavioral response patterns of the hyperactive, emotionally disturbed children were strikingly similar to those of the children with central nervous system involvement. That is, the latter group of children behaved as though they were brain injured, even when the available diagnostic and clinical data had ruled out the existence of demonstrable organic pathology.

As a result of these observations and after very careful planning for the individual child in order to eliminate possible dangers to the child's self-esteem, the Supervisor and her administrative staff arranged for a number of hyperactive, emotionally disturbed children to be class-based with groups of brain injured children in a structured classroom situation. For the first time in their school experience, they appeared able to adjust satisfactorily to the group situation and, for the first time, showed academic gains.

As a result of the controls imposed by the structured classroom routines, group teaching approach, and specialized techniques of instruction, it was possible for the children to develop an ability to conform to the classroom situation. Academic progress was slow but consistent, varying from a gain of one to three grade levels in achievement. As a group, the classroom units developed social cohesiveness, and peer group idientification was noticeable among several subunits within the total group structure. It was felt that these results justified and substantiated the continued use of classroom procedures and grouping policies in line with the educational needs of emotionally disturbed children, rather than their unresolved emotional needs.

The next step evolved out of the recognition that a diagnostic study of all the possible causes which might contribute to, or result in, the learning disabilities and behavior response patterns of the non-brain injured, acting out, aggressive, emotionally disturbed child should be undertaken. The educational philosophy and instructional programming had advanced to the point where classes for emotionally disturbed children were no longer appropriate; but rather emotionally disturbed children were grouped in terms of "classes" or types of educational handicaps.

It was then possible to identify two basic professional limitations in the existing County program in special education:

1. The need for more adequate and intensive medical psychiatric, and psychological diagnostic data, and better reporting of the educational backgrounds and social histories of children in question;

2. The need for public school systems to initiate, within their own educational framework, pilot studies in educational research projects.

Once these needs were recognized, it followed that, should a research project be planned, it would require adequate and intensive medical, neurological, psychiatric, and psychological diagnostic data, as well as more refined methods of reporting the educational backgrounds and developmental histories of the children in question. Furthermore, it was felt that until provisions for more adequate diagnostic information became available, any further attempts to explore the causal factors and/or clinical base of disorders in the learning processes of hyperactive emotionally disturbed children should be postponed. This exploration could best be conducted within a planned controlled interdisciplinary pilot study.

To this favorable research climate in the setting of a public school system was added the research facilities and administrative direction of the Office of Research in Special Education and Rehabilitation of the Syracuse University Research Institute. The resulting research design, which was directed toward the development of a specialized teaching methodology for hyperactive emotionally disturbed and brain injured children was developed and submitted to the United States Office of Education. The project was approved and a grant for a two-year pilot project and demonstration was awarded to Syracuse University.

Thus, the Cooperative Research Project in Specialized Teaching Methodology was jointly sponsored and financed by the Montgomery County Board of Education and Syracuse University with the major funds coming from the United States Office of Education. An additional grant from the Eugene and Agnes Meyer Foundation, just prior to the termination of the project, made it possible to extend the program for an additional 6 months in order to prepare this monograph in its present form and to provide follow-up testing for the children participating in the project classes.

It is important to emphasize that the project provided the opportunity to certain professional needs of the public school system and of the research staff of the University. It was compatible with the professional interests of the daignostic and consultant staff. This factor contributed heavily to the achievement of maximum success in establishing clear-cut communication of the project aims and goals and in the working out of a tightly knit, smoothly operating organization.

A Summary of the Design and Scope of the Demonstration--Pilot Study

The Problem

A pilot study was developed to investigate the effectiveness and value of a non-stimulating classroom environment, specially prepared teaching materials and highly structured teaching methods upon the learning problems and school adjustment of hyperactive emotionally disturbed children with and without clinically diagnosed brain injury.

Specific Aims

There were two chief aims in the minds of the investigators:

1. To investigate and evaluate the instructional usefulness of teaching methods and techniques developed in an experimental setting for brain injured children, in terms of their appropriateness to the instructional and social needs of hyperactive emotionally disturbed children with or without demonstrable evidence of brain injury.

2. This pilot study was to take place and was to be adapted to the administrative policies and procedures of an elementary public school system.

Methods of Procedure

The Location

The proposed study was conducted within the public school system of Montgomery County, Maryland, and was housed in 4 classrooms in 3 elementary schools: two classes, referred to as experimental; 2 as control. The 2 experimental groups were housed in 1 school. This school was chosen on the basis of available space, feasibility of making structural changes in the classrooms, location, and staff attitudes compatible with educational research. The 2 control classes were housed separately in 2 other elementary school buildings. All standard instructional equipment, classroom space, and facilities normally available were provided without cost to the 4 research classes.

The Staff

The administrative, clinical and medical, and secretarial staff members were selected in line with anticipated needs in the diagnostic, administrative, teaching, evaluating, and reporting processes. They cooperated in compiling complete information on medical case histories, learning pathology, behavior disorders, teaching methods, and the adaptation of materials. They assisted in writing up the research findings. The selection of staff members and consultants was made on the basis of their professional competency, interest in the pilot study, experience with children of the type to be studied, and previous contributions in their respective fields. One of the most important considerations in the current project was the selection of teacher personnel for the 4 classrooms. Four teachers and 2 teacher aids were selected. Each received training at an approved teacher education center. Each had been noted as a competent, successful teacher and had had no less than 2 years teaching experience.

Each was a person who had demonstrated success in handling groups of children and at the same time in relating to individual children within the group. The teachers were creative and willing to utilize new teaching materials in an experimental setting. Each teacher had an appreciation of the research design and the learning theory within which this particular study was being confined. Teacher assistants had the same personality characteristics, had somewhat less teaching experience, and had recently been oriented to the problem to be studied. These individuals did not have responsibility for the groups except in the case of illness or absence of the major teacher. Their responsibilities were in terms of assistance in the preparation of teaching materials, observation, record-keeping, operation of audiovisual equipment, and providing teacher relief. All four teachers and the teacher aids received special instruction in the experimentally designed specialized teaching methodology.

The Selection of the Children

Forty children were selected whose emotional difficulties were characterized by hyperactive aggressive behavior and who were educationally retarded. They were between the chronological ages of 6-11 and 10-11 years. They had mental ages not less than 4-8 years and an intelligence quotient not less than 50. They were referred to research personnel through the Montgomery County Public School Department of Special Education.

A diagnostic work-up for each child included complete pediatric, neurological, electroencephalograph recording, psychiatric, psychological and educational evaluations. Developmental and environmental data were collected, and case histories were prepared. On the basis of these data the candidates were grouped into two diagnostic groups:

1. those children with clinically diagnosed neurological and medical evidence of brain injury;

2. those children whose case histories demonstrated psychological behavior and learning disabilities typical of that observed among brain injured children, but whose diagnostic studies revealed no conclusive evidence of specific birth injury, neurological signs or evidence of accident, disease, or injury which might account for the observed behavior and learning disorders.

Group Organization

Following the diagnostic classification of the 40 subjects into 2 groups, they were placed into 4 matched groups of 10 each. Five in each group of 10 had a diagnostic classification of brain injury and 5, a diagnostic classification of emotional disturbance. The 4 groups were matched further in terms of chronological age, mental age, instructional levels, degree of hyperactivity and perseveration, and previous experience in special classes. Two of the 4 groups were designated as experimental; 2, as control.

The Classrooms

Four classrooms were chosen for maximum efficiency in terms of location in the school and adequacy of facilities including lighting, space, availability of toilets, sinks, and storage closets.

As previously indicated, the 2 groups designated as experimental were located in 1 school. The 2 control groups were located in 2 additional schools. Environmental alterations in the 2 experimental classrooms were made according to the recommendations of Strauss and Lehtinen, as modified by the senior author of this monograph. These alterations included walls of a uniform color, individual cubicle work units for each member of the class, closed closets for clothing and supplies, opaque windows, and the removal of all extraneous stimuli, as outlined in earlier sections of this chapter. Other alterations, not specified, were compatible with the design for a stimulus-free classroom environment.

The 2 control classrooms were subject to no environmental alteration of any kind, other than temporary adjustments normally made by the teacher in Special Education classes during the academic year.

Methods and Materials

The teaching methods and instructional materials used in the 2 experimental calssrooms were evolved as part of the research project. They were so designed as to enlist the use of the auditory, kinesthetic, and tactile sensory processes in the learning experience. The instructional day was rigidly scheduled as to time and activity. No instructional deviation from the experimental programming took place during the academic phase of the project unless the educational welfare of a child was subject to question.

The teaching methods and instructional materials used in the 2 control groups included any of the traditional instructional methods and any aspect of the experimental programming which appealed to the interest of the teacher. Such matters as scheduling and planning of activities were left to the discretion of the teacher.

Recording and Evaluating

Anecdotal records were kept by all 4 teachers and the assistant teachers. Tape recordings of activities and classroom ciscussions were made as frequently as is compatible with good teaching practice. Observation by the administrative staff were scheduled on a regular basis and the results recorded for later study. Teaching methods and techniques received constant critical evaluation as to their usefulness to individuals and the group as a whole. Psychiatric, psychological, and educational evaluations were conducted at the beginning and end of the first academic year. Classroom observation by the psychiatrist and psychologist were regularly scheduled. Other members of the diagnostic staff were available for consultant purposes but they were not requested to participate in classroom observation.

Psychological examinations included:

1. Marble Board Tests devised by Strauss and Werner,
2. Tactual Motor Test devised by Strauss and Werner and modified by Cruickshank, Bice and Wallen,
3. Syracuse Visual Figure-Background Test by Cruickshank, Bice and Wallen,
4. Bender-Gestalt Test adapted by Cruickshank, Bice and Wallen as a tactual test,
5. The Draw-A-Person Test adapted for children, from Machover,
6. The Rorschach Test,
7. The Vineland Scale of Social Maturity.

Intelligence and mental age levels were determined by standard instruments including the:

1. Terman-Merrill Revision of the Stanford-Binet Intelligence Test, Forms L or M,
2. Wechsler Intelligence Scale for Children.

Education achievement was assessed by appropriate forms of Stanford Achievement Test - 1953. Other appropriate psychological tests were used as the project needs indicated.

Parent Conferences

Since the specific aim of the pilot project was to evaluate the usefulness of a specialized teaching method within the frame of reference of the public school system, parent contact by the research staff did not include any form of individual or group psychotherapy or counseling. When parents indicated their interest in such assistance they were referred to appropriate services.

Parent meetings were scheduled periodically when there appeared to be sufficient factual information concerning the progress of the children or results of the study to warrant such meetings. Teacher-parent conferences were scheduled at the discretion of the individual research teachers in collaboration with their principal and in line with the policy of the individual school. All parents participating in the project were kept informed of the progress of the project and their cooperation was enlisted prior to the release of any and all information which involved medical or clinical data about their children.

The research personnel attempted to determine during the course of the pilot project whether or not a non-stimulating, rigidly controlled teaching approach, combined with specialized teaching techniques, could effect a more adequate school adjustment and academic achievement with hyperactive aggressive emotionally disturbed children with or without brain injury. The project was both important and timely. It is important, because it proposed to evolve an educational program for hyperactive, aggressive, emotionally disturbed children whose behavior response patterns and learning disabilities constitute one of the most acute and clearly delineated general problem areas in the fields of education and mental health. It was timely, because current research reports in the fields of neurology, psychiatry, physiology, biochemistry and psychology dealing with various aspects of deviations in development and growth were providing more encouraging leads to the nature and results of dysfunction in the learning process and behavior disorders than at any previous time.

Psychological and educational observations conducted in experimental or clinical situations had earlier indicated that hyperactive, aggressive, emotionally disturbed brain injured children did make adequate school adjustment and academic progress in a highly structured environment combined with the use of special teaching methods and materials. This type of methodology had not been adequately tested and evaluated with groups of children in a public school program for either hyperactive brain injured or hyperactive non-brain injured children. It was, therefore, significant to determine the extent to which such a program,devised for brain injured children, would meet the instructional and emotional needs of children with similar behavior patterns, but with no demonstrable neurological evidence of brain injury.

It has been generally assumed that emotional difficulties retard or limit the learning process. This project concomitantly attempted to explore the possibility that emotional problems are a symptom of dysfunction of the learning process and that appropriate instructional programs could alleviate or remediate the emotional difficulties as well as the learning disabilities withoug recourse to individual or group treatment in the form of psychotherapetic assistance.

It was assumed that should the specific instructional program and teaching methods developed in this project prove to be useful, as measured by objective test results and statistical analysis of the diagnostic and clinical data, these methods could be made available immediately to educators throughout the nation who are able to provide adequate diagnostic studies necessary to identify the type of learning problems in their underachieving emotionally disturbed school population.

Significant By-Products

The anlaysis of the diagnostic and clinical data, evidence of social and academic growth or the lack of it, and the determination of therapeutically sound educational methods and techniques pointed up significant implications for further investigation in the following general areas of inquiry:

1. What additional criterion in selecting, matching and grouping emotionally disturbed children for instructional purposes should be utilized in addition to the traditional criterion based on achievement levels, chronological age, intelligence, and behavioral response patterns?
2. What factors are significant in selecting teachers for children with learning problems and emotional disorders?
3. Can administrative policies and procedures combined with intensive diagnostic studies and therapeutically sound teaching programs provide adequate resources within the framework of the public schools for handling the results of acutely disturbed hyperactive underachieving children in a classroom situation?
4. What functional and organic components are combined in the life history of children which produces that type of

behavioral response pattern commonly referred to as hyperactive?

5. To what extent can psychological test responses and their interpretations be used diagnostically in determining the existence of central nervous system injury dysfunction?

6. Should neurological reports indicating the existence of damage to the brain and central nervous system include implications for educational programming and if so, what are the responsibilities of educators and neurologists?

7. Considerable research in the field of electroencephalography (EEG) indicates a high correlation between EEG electrical patterns, certain types of behavior response patterns, and variations in the learning process. What are the educational implications of the results of these findings?

8. Current information concerning the role and function of the reticular formation as an integrative center of the central nervous system indicates that the impact of stress or trauma may result in disturbance of the integrative processes basic to the development of language formulation and communication. What educational implications are there in these data when planning instructional programs for children lacking integration in all levels of adaptive behavior?[1]

9. Current developments in the fields of physiological psychology and optometry indicate that disturbance in body image, self-concept, visual perceptual processes and lack of

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[1] While this problem was and remains important to the authors, the nature of the diagnostic and post-test data did not lend itself to discussion of this question. It remains for further research to implement present data.

coordination in fine and gross motor function are associated with experiential deprivation or injury of one or more of the motor sensory processes. What are the educational implications for the development of new curriculum for children with these problems?

10. The experience of mastery has long been established as a necessary component for the development of physical and emotional growth and maturation. If a child's learning and behavior disorders are characterized by a consistent pattern of inappropriately immature responses to external and internal stimuli, is it possible to provide such experience in an instructional program which translates the needs of an immature organism into an appropriate educational frame of reference which eliminates the possibility of academic failure, and thus reactivate or retain the immature or damaged nervous system which control and/or guides his adaptive behavior?

These questions along with those contained in the original design will be discussed in the chapters which follow. Rational solution to these questions have important implications for special education.

Summary

The research of numerous investigators has indicated a syndrome of psychological characteristics of brain injured children which individually or in combination appear to be detrimental to good learning in school and to positive social adjustment in the community. Chief among these characteristics are those of distractibility or hyperactivity and perseveration. Others, some possible aspects of distractibility, are such factors as motor disinhibition, figure-background disturbance, problems of angulation, dissociation, and inadequate formulation of the self-concept. It is hypothesized that a teaching program based upon original writings of Strauss and Lehtinen can be developed which, through the mechanism of teaching to the disabilities presented by the child, will significantly lessen the impact of the psychopathology and will assist the child to adjustment and learning more nearly in keeping with normative growth patterns of other children of equal age and ability. Among the factors to be considered in such a teaching program are those of reduction in stimuli in the environment, reduction in classroom space, structuring of the educational program, and increase in the stimulus value of the elements to which the child's attention is desired. A pilot study was devised to examine several of these hypotheses.

In the remainder of this monograph, there will be presented an outline of a demonstration-pilot study conceived to explore several of the hypotheses stated in this chapter. Since the original study was in the nature of a demonstration and since the number of variables presented to the investigators was initially very large, this report will be somewhat more informal than that appropriate to a rigorous experimental design. In the hope that future investigators will be able to test more adequately the effectiveness of the authors' opinions and in order to give some direction to school administrators who may be considering the establishment of an educational program based upon this monograph, numerous problems which the authors and their numerous collaborators encountered will be given mention and frequently extensive discussion. The findings of this pilot study are not all positive, nor at the same time are they all negative. There is considerable information contained within the problem which has been presented and in the attempts of the authors to solve this problem to challenge serious and thoughtful educators as they seek ways to meet the needs of many children who appear unable to profit from otherwise rich school programs.

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CHAPTER II

THE ORGANIZATIONAL AND PLANNING PERIOD

As has been stated previously, the current demonstration pilot study was a cooperative undertaking between three major agencies: one provided the funds; the remaining two, the professional implementation. The approximate cost of the two-year investigation was $200,000. The term, approximate, is used advisedly, since numerous costs could not be specifically computed. These are particularly reflected in several administrative costs of Syracuse University and the Montgomery County Board of Education which were in excess of direct overhead costs paid by the United States Office of Education. A small grant to continue the study for 6 additional months from the Eugene and Agnes Meyer Foundation is not included in the above figure.

The University

Syracuse University, through its Research Institute and Office of Research in Special Education and Rehabilitation, provided professional leadership and direction to the study. The contract covering the expenditure of government funds was made between the United States Office of Education and Syracuse University. Thus, all administrative details covering the expenditure of the government and Foundation grants were assumed by the University. University professional personnel provided continuous leadership to the study, approved and participated in the selection of the diagnostic staff, appointed the resident staff, and cooperated in the selection of the research teachers. With the establishment of a Syracuse University office within the school district, close and continuous supervision could be effected. The Project Director attended nearly all of the staff conferences of the diagnostic team and in other ways participated in the active phase of the study on an average of 3 full working days per month after the diagnostic phase had been completed. This was adequate to maintain close contact with the study, to confer with the teachers, to learn to know the children and to be known by them, to observe in the classrooms, to participate in parent meetings, and to confer with public school administrators when such was needed. The availability of a competent research assistant to the Project Director made the time of the latter much more effective when he was in the school district.

The authors have often been asked why it was that a University and a school system separated by so many miles joined together to undertake this study. Over the years the Project Director and the Supervisor of Special Education had observed their mutual interest in the etiology, psychological characteristics, and educational problems of hyperactive children with or without diagnosed brain injury. On the one hand psychological research had been undertaken and completed; on the other, exploratory educational planning had been attempted with these children. When the opportunity presented itself for an initial investigation the mutual interests of these administratively responsible for the program in both of the educational agencies made it logical and important that a joint project be undertaken. In this climate of mutual interest and respect distance was no barrier to successful professional enterprise.

Table of Organization

The administrative organization established for the completion of the study is noted in Figure 1. In large measure the relationships between the University and the School district were completely cooperative. No one person was employed by both agencies with any administrative responsibility. The Supervisor of Special Education had a relationship with the research staff which technically was stronger than that of any other person, but these relationships were never defined specifically and simply evolved over the months as questions and problems arose. The Resident Coordinator, as will be stated below, secured all of her administrative authority through offices and other persons already possessed of such authority. In no instance did she administer the project in the sense that she directed. Cooperation always is time consuming. In the end, however, if carried through in the proper spirit, it should lead to stronger understandings and greater *esprit de corps*. Such proved to be the experience in the present situation.

TABLE OF ORGANIZATION FOR THE STUDY

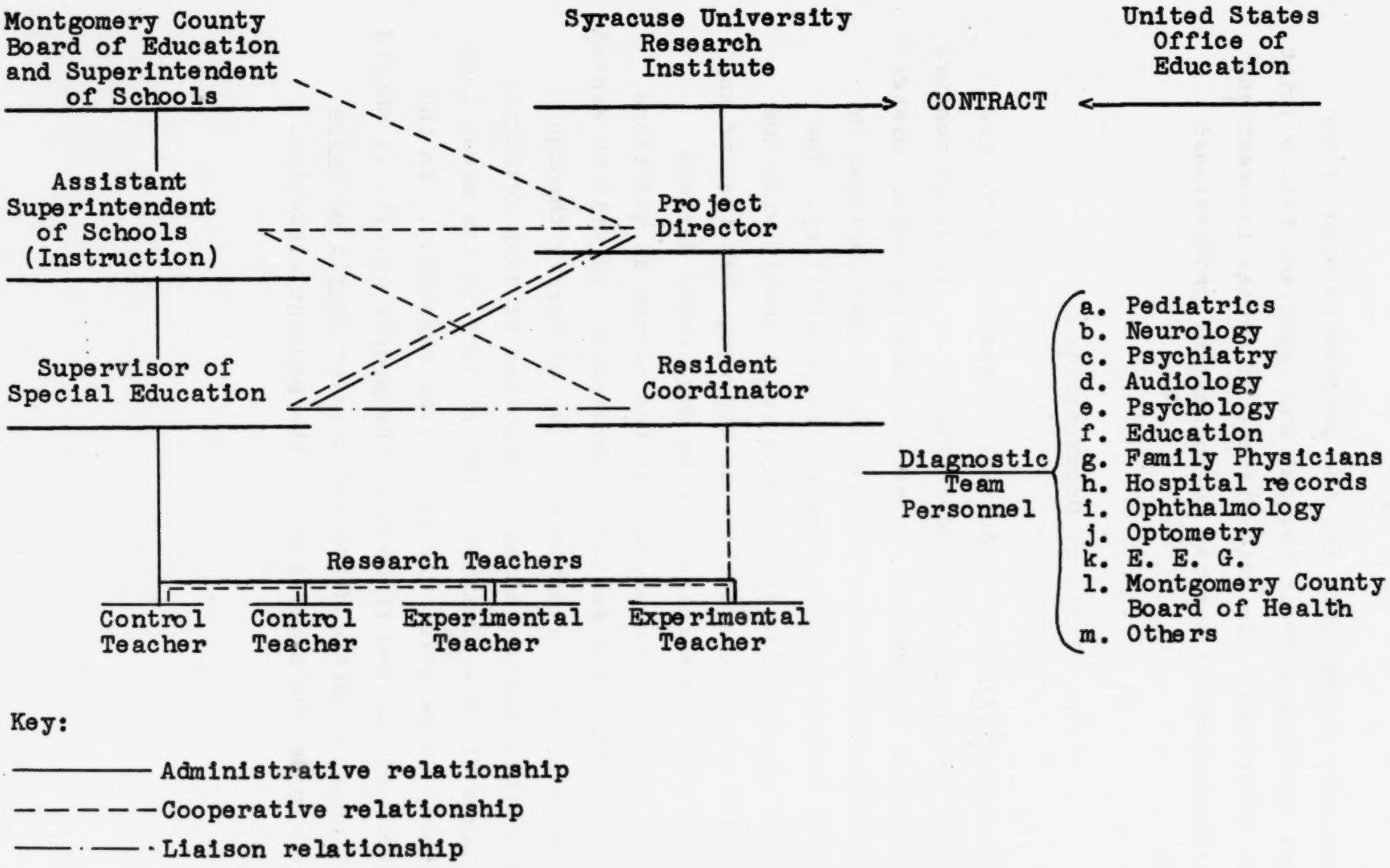
Montgomery County Board of Education and Superintendent of Schools
Syracuse University Research Institute
CONTRACT
United States Office of Education
Assistant Superintendent of Schools (Instruction)
Project Director
Supervisor of Special Education
Resident Coordinator
Diagnostic Team Personnel
a. Pediatrics
b. Neurology
c. Psychiatry
d. Audiology
e. Psychology
f. Education
g. Family Physicians
h. Hospital records
i. Ophthalmology
j. Optometry
k. E. E. G.
l. Montgomery County Board of Health
m. Others
Research Teachers
Control Teacher
Control Teacher
Experimental Teacher
Experimental Teacher
Key:
Administrative relationship
Cooperative relationship
Liaison relationship

Fig. 1.--Administrative Plan for the Pilot Study.

The School District

The Montgomery County Board of Education's contribution included the salaries of the four project teachers and two teacher-aides, instructional supplies and equipment normally available to the teaching staff of elementary public schools, office space, equipment and supplies for the administrative staff, and the reconditioning of the two experimental classrooms to provide a stimulus-free environment.

The assistant superintendent in charge of the Department of Educational Services of the Montgomery County Board of Education was delegated the responsibility for making those policy decisions which arose within the Board of Education as a result of the pilot study. He authorized and supervised the introduction of the research staff's non-school personnel into the classroom situations. It was through the assistant superintendent that the Resident Research Coordinator channeled all requests for project needs, other than those provided by the research project funds. It was from him that guidance and assistance was sought in resolving problems associated with the study which involved deviations from the accepted Montgomery County School Board educational policies and procedures.

Since this was a project involving the Department of Special Education, the supervisor of that department was delegated large administrative responsibilities. The selection of the teachers to be in charge of the research classes was the supervisor's responsibility. All referrals of children for examination were made after initial screening from the supervisor's office. Diagnostic team members were appointed on the basis of her experience and many whose interests in the project were known to her were initially recommended for consideration by her. In dozens of indirect and intangible ways her important public school office made significant contributions to the study.

Related Personnel

School psychologists, remedial reading teachers, special education and regular elementary teachers, school principals and guidance counselors from the school district, all initially, formally or informally, participated in the initial referral of subjects for evaluation. Persons outside the Montgomery County Board of Education also were vital in the development and implementation of the study. Those professionally associated included the Administrator of School Health Services of the Montgomery County Board of Health. He participated in the diagnostic case conferences and acted as Health Department liaison in providing the diagnostic staff with examination rooms, nursing personnel, and the past medical histories of the children scheduled for examination.

The Resident Coordinator

The definition of roles and the delineation of responsibilities in educational research programs and projects for atypical children may create problems and conflict situations in school administration, policies, and procedures. Specialized teaching methods and special education curriculum guides and instructional materials which differ from established instructional manuals and teaching techniques frequently result in policy problems between special and regular teachers, their principals and supervisors. Small group size, unusual or bizarre behavior on the part of disturbed children and stigmata or physical handicaps frequently precipitate feelings of anxiety and uncertainty on the part of teachers, parents, and principals unfamiliar with the behavior and appearance of some atypical children.

Research projects carried out within the framework of departments of special education further complicate the existing professional and interpersonal situations by introducing criteria and controlled variables which frequently appear to run counter to traditionally accepted methods of providing for the education welfare of the children assigned to research classes.

Within this frame of reference, it is particularly important that a coordinator of an educational research project:

1. possess professional training and work experience which prepares him to handle complicated anxiety-laden interpersonal situations with warmth, objectivity, and professional maturity;

2. be familiar with traditional elementary public school administrative and personnel policies, curriculum manuals, instructional methods, and status problems associated with the teaching profession;

3. be aware of the impact of educational research upon research teachers' morale, and be prepared to handle these anxieties with reality-based techniques;

4. possess a thorough and complete understanding of the particular research design as well as its aims and goals, and be able to translate the procedures, aims, methods, and goals into an instructional frame of reference.

For example, when a research project is introduced into a public school setting, the first response of the teaching and administrative staff is one of enthusiastic support. It can be predicted, however, that once the planning and organizational phase is completed and the class or project is integrated into the school setting, the initial enthusiasm is apt to wane for the following reasons:

1. the principal and teachers are apt to feel their authority and status is threatened as a result of the presence of specialists associated with the research project;

2. the regular teachers are apt to become resentful of the small groups of children utilized for research purposes and of the research teachers who receive so much special attention while the regular teachers and their groups of 30 or 40 children receive no additional help or guidance;

3. the project teachers find their instructional day interrupted by observers, testing procedures, extra conferences, and additional work over and beyond that normally required of all teachers.

A coordinator who is unaware or inexperienced in anticipating and planning for these potential conflict situations will quite justifiably become a person to blame if things go wrong. In such situations additional tensions develop and "those specialists" or "that project" become hooks on which very serious and time consuming parent-teacher, teacher-principal, teacher-teacher and teacher-research staff interpersonal and professional problems are hung. An individual who, previous to coordinating a research project, has become an accepted and valued member of a regular and special teaching staff is in an excellent position to become an effective member of the administrative staff of an educational research project.

The person best equipped to evaluate school and medical records for an educational research project involving classroom practices is one who is able to understand the meaning of school reports and recording language. He must be able to translate these understandings and clues to various types of medical and psychiatric conditions into specific reasons for the child's learning difficulty and, finally, to assess those difficulties in terms of its applicability to the specific research design in question.

In those cases where the research design is interdisciplinary in nature, a coordinator with some background or experience in psychiatry, medicine, education, counseling, and, if possible, previous work in educational research, can be put to excellent use in assisting in the selection of the diagnostic staff for the project.

In addition to assisting in the selection of the staff, a coordinator arranges appointments and conferences for each member of the proposed staff to meet individually with the Project Director, School Health Administrator, and Board of Education liaison. This initial conference is important in order that professional approaches and interests in interdiscipline diagnostic problems and the research project goals can be explored. During such conferences, it is helpful to identify areas of special interest in each discipline which may be related to the research design in a mutually profitable way, thus establishing areas of professional compatibility.

After the staff is employed the arrangement of staff conferences becomes an important function of the resident coordinator. Conferences including the Project Director, representatives from participating agencies, Board of Education administrative personnel, secretarial and clerical help, and the diagnostic staff should be arranged so that each member of the conference is provided with an agenda which permits organizational problems to be handled through an objective exploration of the factual material related to the problems at hand. It is the structure of operation rather than the problem itself which is emphasized.

Areas of interdisciplinary controversy frequently associated with differing viewpoints in problems of differential diagnosis, status and role problems of the individuals participating in the study, matters of scheduling and referrals, procedural methods, and problems associated with the question of medical ethics, may all be handled by a coordinator through the administrative technique of the written agenda and the staff conference. Time for the satisfactory rationalization and solution of these controversies and problems must be arranged. It is essential that the coordinator in preparing the agenda and arranging the staff conference be free of any personal investment or bias in favor of any one of the particular disciplines represented, and be familiar with each discipline's traditionally accepted method of organizing and interpreting diagnostic data. Helpful, but not essential, is the corrdinator's understanding of the major problems and conflict areas within a discipline and among the various disciplines involved.

If possible, it is wise to schedule the order of business so that the first two items planned for discussion are non-controversial in nature, thus providing the staff with a solidly realistic feeling of achievement before group discussion of anxiety-laden problems arise. The use of the agenda is an excellent technique for setting limits and controlling the overflow of anxiety which frequently manifests itself in staff conferences in the form of rambling digressions. Without the aid of the agenda, there is little chance of handling this overflow of anxiety in an impersonal manner.

If it is possible to arrange the staff conferences so that the research coordinator does not act as chairman or as an authority figure in any capacity, it is wise to do so. In the current study this chairman was almost always the Project Director. This arrangement diminishes the status role of the coordinator and makes it possible for him to maintain a free-flowing interpersonal communication with each of the staff members.

It is important that the subjects for discussion on the agenda remain specific, concrete, and concerned with exploration of various techniques of handling a given situation. Thus, the final decision as to a particular method or technique selected for dealing with a particular problem or situation results from concerted group action and not as a result of one (person's) way appearing to be better than another (person's) way.

In summary, the role of the research coordinator within the framework of personal selection, staffings and agendas, is and was that of the assistant, the planner and writer of agendas, and the originator of arrangements for the care of reality problems, including such matters as scheduling the time and place of staff conferences. Careful, methodical, and well-planned staffings established the corrdinator's role as the means by which problems and needs are channeled to the Project Director, other administrative personnel or other appropriate authority figure. The above considerations were implemented throughout the present study.

During the diagnostic period, a coordinator used the staff conference discussions and diagnostic decisions as a guide (after the initial period of scheduling) for selecting and channeling to the medical staff those children whose problems may best exemplify unresolved problems in differential diagnosis at different stages during the examination period. Staff discussions of problems of differential diagnosis was recorded in full and with greatest accuracy, to be held against the time when diagnostic emphasis might tend to fluctuate and for the stage at which the problem of matching and grouping the children must be resolved.

There is perhaps no more critical period during an educational research project than the period during which the project and its personnel are new to the school system, the parents, family physician, and the related agencies with which the project necessarily and appropriately becomes involved. If the services of a coordinator are utilized, it is necessary for the individual selected to have sufficient personal maturity and professional insight to understand that no matter how competently this initial period is handled, there will be periods of interpersonal and interdepartmental conflict. The initiation of educational research projects providing additional classroom space for children with learning needs may precipitate competition and rivalry among various departments of the school system, the health department and related agencies. It is imperative that an individual acting as a research project coordinator realize that this rivalry is not associated with a role *per se*, but is due to the existence of large numbers of school age children whose emotional, social, and educational problems may not be provided for under current conditions. Understanding and accepting of this problem helps a coordinator to keep in mind the fact that no matter how personalized a situation may seem to be, it develops in fact because a research project represents a new source of help and possible school placement for troubled children. The methods, means, and available facilities for resolving the problems of children with emotional disturbances and learning difficulties are so negligible in the face of established needs, that those who are employed in an attempt to resolve the problems and provide facilities may experience failure, not because they do not know what is needed, but because the professionally trained help, classroom space, and teachers needed to solve the problems are not available within the provisions of a single research project or the public school system.

It is important for the person appointed to the role of a coordinator to realize that during the first 3 to 5 weeks of the academic year, teachers regularly experience one of the most anxiety-producing periods associated with, or perhaps even a part of, the teaching profession. Among teachers, this period is referred to as "holding my group," and the close of the period is indicated by the teacher's informal announcement that she "has her group now."

For example, one teacher, in discussing the stresses and strains of this period, said flatly, "No one can teach a collection of individuals who haven't even learned how to work with each other, let alone work with the teacher. The hardest job in the world is to teach the children how to work together. Once that's done, half your teaching worries are over . . . . Anybody can do a good teaching job once they 'hold their group.'"

A coordinator, while recognizing that teacher anxiety is normal to this particular phase of the instructional year, must exercise the firmest kind of self-discipline in order to avoid overidentification with teaching personnel during this period. His job is to be available, on a round-the-clock basis, if possible, in order to provide missing supplies, instructional equipment, teacher breaks, and whatever classroom environmental adjustments within the research design limits are helpful in the way of additional desks, chairs, tables, and equipment. A coordinator does not, under any circumstances, attempt to explore the anxiety in the interest of providing supportive therapy, even though the teacher may make a verbal request for this type of assistance.

A coordinator who fails to observe this cardinal rule of good professional ethics will find, first, that, even though the teacher may feel extremely hostile because, as a teacher, she has demonstrated that she is uncertain in her own mind as to whether she can consider herself equal to the task of "holding her group" the rest of the year. Second, the children are keenly aware of any situation where there is any indication that "my teacher can't handle us and had to ask for help." Once this suspicion has been justified, it may take as long as 6 months for the teacher to "hold her group."

Some teachers frequently feel, during this initial period, that certain children were improperly assigned to their group. The coordinator who acts on the assumption that this is an indirect request to have the child transferred substantiates the teacher's false suspicions of her own professional inadequacies. These fears are usually completely inappropriate and unrealistic in terms of the teacher's total teaching strength.

If the teacher, for example, feels one child is much too tall (or too old, or too young, or too disturbed) for her group, and will be excessively unhappy as a result of his placement and should be transferred to another group where he can establish better relationships, the corrdinator (if the child is taller than the other children, for example) makes certain that the desks which have been provided for the teacher includes one of the correct height for this child, and works out with the teacher the best seating arrangements in terms of seating proximity to the next tallest children. He does not explore the teacher's unexpressed concern as to the child's possible reasons for being unhappy, or the teacher's personal reasons for thinking that he is unhappy. He does handle the situation on a reality-based level of assistance. The coordinator gets things done no matter how much time it takes or how many people have to be seen. Once this initial period is over for the teacher, for the children, and for the coordinator, the coordinator absents himself from the classroom situation in order that the teacher may be free to get on with her teaching program.

If a coordinator has established the fact that he is useful and helpful during this anxiety period, the teacher can then be expected to request the use of the coordinator's services when she needs them, and not when the coordinator thinks the teacher needs them. When this particular status quo has been reached, both the teacher and the coordinator can turn their attention to other and more pressing matters. These philosophical considerations were basic to this study.

In conclusion, a good coordinator is one who helps to define the role and function of individual members of the staff in relation to each individual and to the research project's philosophy, aims, and goals. Success in fulfilling this role can best be measured when the staff with whom the coordinator is associated is unable to define the coordinator's role or function but knows that the program just wouldn't work is he were not available.

The Diagnostic Staff--Selection Criteria and Group Organization

". . . the problem of multidisciplinary research is basically the problem of small group organization in which two or three, rarely more than four, technically distinct disciplines are represented. This requires clear and precise communication, as well as a definition of compatible goals . . ." (1, p. 467). The four disciplines represented in the present study were education, medicine (including pediatrics, neurology, psychiatry), psychology, and audiology.

Two major factors facilitated the development of a smoothly operating group organization. First, each individual member of the diagnostic staff was professionally acquainted with the type of child typical of the subject population of the research project; and, second, all members were sympathetic to the research goals and had had previous experience in diagnostic investigations of the clinical and medical and psychological factors operating in underachievement and behavior disorders.

The speech pathologist and audiologist, for example, as a result of her professional affiliation with John Hopkins University Hospital's Department of Otolaryngology and Environmental Medicine and the Diagnostic Speech Clinic of the Montgomery County Health Department, was professionally acquainted with a number of the children and parents who participated in the project. In addition to her familiarity with some of the subject population, she had for a number of years been deeply concerned with the diagnostic and treatment problem resulting from the presence of speech and language formulation difficulties when no demonstrable evidence of end-organ hearing loss or central nervous system damage existed.

The staff neurologist, in addition to having had long term professional association with some of the children from whom the project selections were made, had also been instrumental in organizing a clinic to provide for multidiscipline study of diagnostic and treatment problems associated with retarded mental development and damage to the central nervous system. (It should also be mentioned that the neurologist had assisted in the original planning of the research design.) Thus, the project design, aims, methods, and goals all reflected the neurologist's research interest in the possible neurological basis of specific types of learning problems and behavior disorders.

The project pediatrician was, at the time of his appointment as a member of the diagnostic staff, the pediatrician at the District of Columbia Department of Public Welfare in Children Center at Laurel, Maryland. In this work the staff pediatrician had become keenly aware of the role that underachievement and unsatisfactory school experience played in delinquency and emotional disorders. Thus, the long range goal of the project, i.e., the development of specialized teaching methods and instructional programs geared to the learning difficulties and emotional problems of underachieving children, coincided with an area of his specialized pediatric interest.

The psychiatrist had worked closely with public school teachers and administrative personnel, particularly in the Montgomery County Department of Special Education. As a result of establishing herself in a participant-observer role in the classroom situation, the psychiatrist had acquired a clear and practical understanding of the group teaching problems associated with classroom management and instruction of children with behavior disorders and learning problems.

Thus, the main criterion of selection which determined the appointment of the individual members of the diagnostic staff were first, a high degree of professional competence and maturity in their respective disciplines; second, professional and personal interest in the research problem and an awareness of the need and importance of developing teaching programs for underachieving children with associated emotional disorders; and third, professional experience in working with the school population from which the research subjects were chosen.

To the above staff was added the services of a full-time research clinical psychologist whose professional background and orientation in the problems of differential diagnosis in children with central nervous system involvement added much to the over-all competency of the diagnostic team. The experience of the clinical psychologist included institutional work with mentally retarded children and professional responsibilities in a child guidance center. For an extended period of time he functioned as a clinical psychologist under the supervision of the Project Director in an out-patient diagnostic and evaluation center for the psychological study of physically and mentally handicapped children. Thus, his experience was extensive in relation to children and intensive with relationship to the project immediately at hand.

It will be noted that the clinical psychologist was employed in the study on a full-time basis whereas all other diagnostic staff members were employed on a part-time basis. There were numerous obvious reasons for this. The primary basis for the decision was encompassed in the nature of the services to be performed by the psychologist. His work included the pre- and post-examination of all the children wherein he utilized a very extensive and time consuming battery of psychological instruments. This work could not have been concluded on a part-time basis. As a matter of fact, much additional part-time psychological assistance was provided to this member of the professional team. In addition, the clinical psychologist was responsible for scheduled observations of the children throughout the school year, and for the interpretation of psychological test data on each of the children to the teachers. Much time was spent by this individual in teacher conference. Finally, statistical treatment of his data and preparation of written reports concluded his professional obligations.

In the actual function of the diagnostic team during staff conference periods two other individuals also participated. The Supervisor of Special Education in the Montgomery County Public Schools, as has been mentioned, served as a liaison person between the school system and the research staff. Her interest in the education of these children over a long period of time has been previously recorded. She thus brought to the team conference table, not only an excellent understanding of the educational characteristics of the children being discussed, but also a complete understanding of each child's school behavior, history and a broad background of interdisciplinary information regarding the nature of the children being discussed.

The Project Director also participated in the team conferences. His background as a psychologist and educator and his previous psychological research with the learning problems of the children being considered, made it possible along with the insights of the Supervisor of Special Education to integrate the numerous specialists' reports and to obtain group decision regarding the admissibility of a given child to the project.

From time to time as various specialized problems arose other individuals participated in the staff conferences representing the disciplines of psychology, medicine, and education. The Director of the School Health Services of the Montgomery County Board of Health was an invaluable member of the team and was almost always in attendance at staff conferences.

The thoughtful reader will at this point be alert to the fact that there were some omissions from the diagnostic team. The authors are quick to point up these omissions for they were immediately apparent to them and to the others participating in the study. The sole reason for any and all of the omissions was that of finance. While extensive funds were available for the study, they were not sufficient to provide as complete a diagnostic picture as had originally been hoped. It must be pointed out that this was not due to initial inadequate planning, but due to a reduction in the size of the grant originally requested.

The most serious omission was that of a social caseworker. Were the study to be reinstigated at a future time, a full-time medical social caseworker would be considered by these authors as a member of the team. In the present study this function was not completely filled at any time, although the pediatrician, the psychologist, and the coordinator each and together provided much background data normally the function of casework. The other important functions of medical social casework, however, were simply not fulfilled, and the study suffered to this degree.

It may appear that nursing personnel were not represented. They were not included as permanent members of the team. Nursing services were available to diagnostic personnel during the period of the examinations insofar as they were necessary.

Another serious omission pertained to complete ophthalmological and optometric services. Both disciplines were represented in the community by highly specialized personnel. Because of the limitation of funds, however, such services were utilized only for those children who presented visual symptoms in other clinical situations. The authors recognize the importance of complete ophthalmological information, particularly in this type of an educational study. However, it was impossible to routinely provide for this in what was originally considered to be the priority list for minimal professional services. To compensate for this general lack of information, all other diagnostic personnel were sensitive to the visual status of the patients who were being examined and liberal use of referral was made.

The Staff Conference

It was initially felt that all children should be individually presented at a staff conference by the several disciplines represented in the diagnostic team. The original purpose of this was to develop as quickly as possible a unanimity of feeling regarding the problem being considered. It was also felt that as soon as staff members felt comfortable in the fact that there was a "meeting of the minds" among themselves, the diagnostic phase would proceed at a more rapid rate and with greater assurance on the part of each member.

Diagnostic team members spent many full days together in these discussions. Each of the children finally selected as a member of the study groups was considered with pediatric, psychological, neurological, audiological, psychiatric, and educational data being extensively presented and thoroughly discussed. Seven children, not ultimately included in the groups, were screened out at this point. It was in the staff conferences that numerous digressions occurred, stimulated by professional differences, lack of understanding of one another's vocabulary, and differing personal orientations to the problem. It was here that the role of the coordinator played a crucial part. For while, as mentioned earlier, the coordinator did not chair the staff conferences, she was present to hear discussions, to objectively observe confusions, and to make notes on those points which should be considered individually with a member outside of the group environment. This individual contact by the coordinator made possible a high degree of group participation and function when the team operated together. In general, the staff conferences were characterized by a marked degree of unanimity of point of view and always by a healthy feeling of mutual cooperation.

Since so much of the result of any special education experimentation depends on the adequacy of physical data regarding the subjects, it goes without saying that the selection of the diagnostic personnel is among the most important elements of any design. This is oftentimes not thoroughly understood by educational administrators or those related to fund granting agencies. The inclusion of these non-educational representatives in an educational experiment is not looked upon as essential or appropriate. The contrary is, however, true and is apparent to the thoughful scientist. No educational experimentation in the field of special education can be undertaken without the support of medical disciplines and psychological disciplines in at least the diagnostic and subject-finding phase of the study. The results of too many educational experiments must be looked upon with distrust because the reader is unable to ascertain the nature of the children included in the study and the principal investigator was professionally unprepared to make these decisions himself. Thus, in the present educational experiment a major proportion of the research funds was spent in medical and psychological diagnosis and in an attempt to sufficiently describe each of the children ultimately studied so as to provide the reader with as complete a picture as possible of the subject population. The findings of educational experimentation are relatively worthless if the reader does not have a good understanding of the population to which the findings apply. In the present pilot study nearly 10 months were spent in selecting the diagnostic team members, orienting them to the problem, scheduling and completing examinations, and holding staff conferences. The nature of the activities specific to this period will be discussed in Chapter III of this monograph.

Footnote Reference

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CHAPTER III

THE DIAGNOSTIC PERIOD

In this chapter the authors first desire to provide a frame of reference pertinent to the children out of which the research problem was developed and on which basis the children were selected for the project. Second, there will be reported the methods and techniques utilized in the pre-diagnostic screening, selection, and referral of the project candidates to the diagnostic staff. Third, there will be reproduced in detail the individual diagnostic and clinical reports of the examinations of one child as they were recorded by the examining physicians for the staff conferences. Finally, diagnostic data collected from hospital obstetrical records will be presented and discussed together with implications drawn from electroencephalographic studies made of each of the children during the diagnostic period.

A Composite Description as a Frame of Reference

The presentation in non-technical language of a description of a family and child composite represents a departure from established methods of reporting clinical data which customarily outlines the behavior pattern to be used as a guide in designing the research problem and in the pre-diagnostic selection of the group of children who are to participate in the project. The descriptive composite not only accomplishes these purposes, but also provides a frame of reference for the remaining portions of this chapter. This particular frame of reference is one in which children are, at first glance, seen as problem children, but, as the results of the examination are accumulated the children gradually emerge, are viewed as a group of individuals whose specific learning disorders and behavior patterns pinpoint unresolved problem areas in all the disciplines which are concerned with birth, growth, development, maturation, and learning in human beings.

Keeping in mind that no such child or family exists in reality, some aspects of the composite behavioral response pattern which are familiar to parents will be seen as an entirely different behavior pattern to teachers and vice versa. Psychiatrists, neurologists, and pediatricians will recognize herein some of their most difficult, distracting, and likeable patients. It is entirely possible that if such a child did exist, he might, under various circumstances, be classified as brain injured or as one demonstrating several signs of brain injury, evidence of organicity, or minimal brain injury. He might be viewed as emotionally disturbed; as having a home problem; a psychopathological personality; a weak ego or lack of ego integration; as lacking inner controls and requiring a rigid, controlled, and highly structured environment; or as needing an environment which is warmly permissive. He could be regarded as needing immediate long term residential treatment, or as not being amenable to psychiatric treatment. In some situations such a child might be classified as being a "real boy" whose discipline problems are ones which he will outgrow.

First--it is usually a boy. His parents are white, as were their mothers and fathers before them. They may believe in the Catholic, Protestant, or Jewish religion, but do not necessarily attend the church of their faith. The father, a rather quiet man in his late thirties or forties, may be a truck driver, nuclear physicist, manager of a chain store, biochemist, or theoretical mathematician, but no matter what his profession is, he performs his chosen occupation with outstanding efficiency, dependability, and intelligence. During the week he works long hours, frequently leaving the house before his son is up and returning after he is asleep.

On weekends, if he is not working, he tries very hard to spend some of his time with his son, to find things to do together, but when he succeeds in initiating some joint enterprise, his son for no apparent reason wrecks the afternoon by carelessly thrusting the hammer into the power saw while it's going at high speed, kicking over a bucket of freshly mixed paint, or sticking his finger into a light socket and then exploding into yelling fury when he is jerked to safety. The father, unable to comprehend the violence of the explosion or to control his son's behavior, more often than not, retreats to the bastions of his work, remarking to his wife as he does so that she is too easy on the child. He needs more discipline.

His wife is an attractive, outgoing, intelligent woman who, up to the time of her son's birth, thoroughly enjoyed her job as a secretary, nurse, teacher, economist, or mother of the two previous children. Before children were born to her, she was active in civic affairs and frequently participated in various types of adult study groups. She enjoys a good fight, although she has learned for the most part to control her aggressive drives in the interest of maintaining harmony in the family and neighborhood.

At this point in time, her relationships with her son are at an all-time low because he demands constant attention and rebels fiercely when he gets it. He refuses to share his toys with his little sister and knocks her down when she asks to play with his truck collection. He fights with the neighbor's children, except those much younger than himself with whom he spends more time than a boy of his age should. Although he is constantly hungry, especially for sweets, during the family dinner hour (to which he is customarily a half hour late) he fiddles with his food until, under the threat of maternal violence, he gulps it down, frequently eating with his hands instead of the silverware, which he throws to the floor upon being reprimanded for bad manners. Although he is an alert, attractive lad, he is failing in school and may have been retained a year or even excluded from school because he refused to settle down and get to work.

At their wits end, the parents finally take their boy to his pediatrician who more often than not, finds him physically healthy, somewhat hyperactive, of normal or superior intelligence and, most comforting of all, a child who will probably "outgrow" his current behavior problems. It is to be noted, however, that during this conference and the many others which follow with teachers, principals, school psychologists, counselors, and therapists, the parents' conversation is apt to have a curiously detached quality, almost as though they were helping the professional to understand the problems of a close friend's child for whom they feel a great deal of warmth and a very deep personal concern, but no real responsibility.

The boy, himself, established his reputation as a classroom discipline problem between the ages of 6 and 9. He may have had a trial period in a nursery school or a kindergarten group around 5 years of age, but after a very hectic week or so, he was probably sent home as being too immature and not ready for group experience.

In the third grade, if he hasn't already been excluded from school, he is frequently disruptively aggressive. He talks out of turn, forgetting or neglecting to raise his hand. He appears unable to sit still and is constantly wiggling, fidgeting, twisting, and jouncing up and down in his seat. He runs and does not walk in the halls, no matter who's watching nor how often he is reprimanded. His shoe laces, zippers and buttons, once undone, remain untied, unzippered and unbuttoned until standards of decency and orderliness are finally reestablished by weary adults. His pockets bulge with miniature trucks, cars, and playing cards with which he plays all day, frequently humming, making odd noises, or talking to himself as he does so.

Physically, he is well built, attractive and appears to have good motor coordination. Even though he is frequently awkward and clumsy on the playground and in the classroom, it is assumed that he doesn't take time to look where he's going.

In the classroom, during work periods, he is unable or refuses to follow directions. If pictures, for example, are to be pasted at the top of the page, he pastes his at the bottom and frequently on the wrong side of the paper. If his teacher takes time to give him the directions again, he loses the thread of what she is saying before she's finished the first sentence. If he manages to complete any work at all, it is indescribably sloppy and carelessly executed. He agrees with everything the teacher says and on occasions treats her with great respect. The next minute he denies he took the pencil from her desk which is sticking out of his pocket. His books are torn and dirty.

He shrieks and cries like a frightened two-year-old if he cuts his finger. However, when the basketball lands on the roof of the school, he climbs the side of the building (with no visible means of support), retrieves the ball, which he refuses to throw to the waiting players, and shinneys down the drainpipe, kicking at someone's head as he jumps the last five feet to the ground.

No matter what he scores in terms of a functioning IQ (intelligence quotient), the school psychologist reports that the test results are characterized by an unusual spread. He fails, for example, in some tasks at a level 4 years below his chronological age. In general, his greatest strengths are on the performance level and greatest weaknesses in the area of verbal concepts. The examiner frequently concludes his report with a statement that he does not feel the final score is a valid estimate of the child's potential.

The boy may not be able to read at all and he may test at the same readiness level for 3 consecutive years. Or he may read with great fluency 2 years above his chronological age, but be so lacking in comprehension that, if he is asked to repeat the story in his own words, he will be unable to think of a single thing to say that is relevant.

He is somewhat better at arithmetic, but his worksheets, which he twists about or turns at an odd angle as he works, are usually in shreds by the time he should have completed the assignment. His spelling and handwriting, if they are at all comprehensible are atrociously inaccurate and carelessly executed. In his everyday speech, as well as in his reading, writing, spelling, and arithmetic papers, one notes reversals, substitutions and omissions of words. He dislikes art class, refuses to participate in finger painting and frequently loathes clay, which he throws at the other students. He likes fans, motors, small trucks, and the pets which he mistreats.

He rarely has friends, although he frequently has accomplices both at home and at school. In playground activities, he is something of a bully. He refuses to participate in organized group games, but then harries his classmates from the sidelines. He appears to be completely devoid of even a rudimentary sense of fair play or of the existence of rules. In general, he gets along better with adults than with children. Adults are often attracted by his graceful charm, but are apt to have the feeling that they are unable to reach him.

On occasions, he explodes into temper tantrums, or apparently unprovoked rage reactions of such violence that he may constitute a danger to himself or others. At times it appears that his only regret after such episodes is that he did not kill or demolish the offending object.

He loves ritual, marching, and making up elaborate rules. He would give his immortal soul to be a member of the school patrols, but even if he is able to read and understand the patrol pledge, he forgets it two days later as he does the rules and regulations. He loses his patrol badge, coat, belt and hat, and has a difficult time giving directions at the intersection because he apparently doesn't remember the difference between left and right.

And finally, in the neighborhood he may, or he may only be suspected of being a thief, a firesetter, or both. On the other hand, he may be the idol of the neighborhood mothers and his teachers because in both deportment and dress he is always a perfect little gentleman. But no matter how he appears to others, after the long day's frustrations and failure to get along, at night he wants closeness and warmth more than almost anything else in the world, even when he twists his body sharply out of the very arms which would give him what he needs and wants most.

Professional Guide

It was this frame of reference of the composite boy and his parents that provided the teachers, principals, and others the basis for the pre-diagnostic screening and selection of the children who participated in the project.

Whether this boy is brain damaged, emotionally disturbed, or both, it was the assumption of the educators who developed the research design that the available educational methods by which he was expected to learn how to learn and how to behave, at home and at school, were inappropriate to the ways in which his particular mind, ears, eyes, and body operated in a learning situation.

Pre-diagnostic Screening Procedures and Techniques

The lack of uniformity and standardization of special education programs and services makes it impossible for recommendations and suggestions regarding any one particular method or methods of screening and selecting children for purposes of educational research projects. It may be helpful to the reader, therefore, at this point to report the specific procedures followed in the present project in screening and selecting the children for later referral to the diagnostic staff.

Underachieving children with learning problems and emotional disorders are frequently known to many agencies and may have long histories of educational, medical, psychiatric, and community problems, as illustrated in the preceding composite. Background histories on children with these difficulties are rarely accumulated in one place. Therefore, it was most fortunate that the personnel (the Resident Coordinator and the Supervisor of Special Education) responsible for pre-diagnostic screening and referral were familiar with the services, personnel, policies, and procedures of the Board of Education Department of Special Services, Pupil Personnel Department, Department of Psychological Services, Health Department, local non-school mental health clinics and facilities, as well as the clinic and treatment centers in the area which had established working relationships with the public school system. As a result the staff knew where to go to locate pertinent information for review and evaluation of the background history of the children's difficulties. It was also extremely useful to know, in each particular case, through whom to channel requests for the review of confidential information in each department or agency.

With this backlog of experience and information, it became possible to operate smoothly through interagency channels of authority and to resolve problems of referral procedures and policy matters with a minimum amount of time and friction. Awareness on the part of project personnel responsible for the selection of children of specific areas of intradepartmental and interagency conflict was frequently found to be helpful in maintaining good public relations.

It was important that the right of free access to confidential records had been previously established. It should be pointed out that this can only be expected if the person selected for the coordinating role has had an opportunity to work closely with the administrative personnel who are responsible for confidential records and that the relationship is characterized by professional integrity, good sense, and discretion.

Specific sources of referral from which the candidates for the research project were selected included:

1. Department of Special Education. This department referred children who were having difficulties in their current school placement and also provided a list of children who were waiting special class placement.

2. Department of Psychological Services. Children whose recent school problems and/or behavior disorders had resulted in principal requests for psychological testing were referred by this department and included children who were in regular classes.

3. Department of Pupil Personnel or Pupil Evaluation. This department dealt with children for whom special class placement had not been possible due to the severity of the difficulties, lack of classroom space, or an inadequate number of special education teaching personnel. Children who were new to the community and who had been transferred from special classes in other areas were processed through the Department of Pupil Personnel before being assigned to an appropriate class. The names of children for whom parents, family physicians or teachers had requested special assistance, as well as children new to the school area whose parents recognized their child's educational handicaps and had asked direct assitance in finding the proper school placement were also referred for evaluation.

4. Health Department personnel and family physicians referred children in whom they had a professional and/or personal interest and whom they considered appropriate to the research study criteria.

5. School principals and teachers provided the names of children with whom they were having difficulty, in some cases with no more information than the child's name and his teacher, and the fact that he was a non-reader or discipline problem.

6. Parents, particularly ones new to the community, whose children had not yet been placed in school, as well as parents whose children had been excluded from school in favor of residential treatment or intensive psychotherapy, on occasion took matters in their own hands and referred their own children for project consideration.

In this first step in the screening process, the task was to look for children who met the specific research criteria in regard to chronological age and intelligence. Individual children whose scores did not meet the criteria received consideration only when the administrative and diagnostic staff were provided with documentary evidence that the existing testing measurements and/or diagnostic skills did not provide accurate measurements of the individual potential. Evidence or clues indicating the existence of a hyperactive behavior pattern, academic underachievement and brain injury were carefully noted. The names and folders of children excluded from consideration as a result of this gross record screening were returned immediately to whatever referral source had made the name and record available. Great care was taken in returning these records to specify exactly why the case did not meet the needs of the project, and when possible, the opportunity was used to explain, in as much detail as was appropriate, the nature of the project, its aims and goals, and any aspects which could be expected to provide assistance to the department or agency in question.

Once the gross record screening was completed, a detailed examination of the teacher and principal reports and anecdotal records was begun in which information pinpointing the individual behavior response pattern and outlining the learning problems of each child was carefully noted. Following this, the school psychological reports were examined for comments which offered clues as to the nature of the learning and emotional difficulties of individual children.

Examination of the application for special education or special services, when available, frequently provided information on previous schools attended as well as teacher reports of academic weaknesses and strengths. Information regarding past medical and psychiatric histories was also regularly included in these records.

The subject population of the four research classes was selected for pre-diagnostic screening from a total of 460 referrals from the above indicated sources. It included children already enrolled in the Department of Special Education classes who were not felt to be achieving at their maximum potential; children who had been accepted for Special Education classes, but whose class assignment was pending due to lack of classroom space and/or teachers; and children who had been referred for Special Education work-up and placement by school principals, health department officials, pupil personnel workers, school psychologists, parents, private physicians, or therapists.

Selection of the Sample

Pre-diagnostic screening of the referral population of 460 children eliminated all but 67 of the total number referred. These 67 children showed a range in chronological age of 6-10 through 9-9, in mental age from 4-8 through 8-10, and an IQ range from 61 through 107.

The research design criteria specified that the total subject population was to have clinically demonstrable evidence of forced responsiveness to stimuli, short attention span, visuo-motor or other perceptual difficulties, hyperactivity, disturbance in figure-ground relationships, impulsivity, perseveration, and/or evidence of language and speech formulation difficulties. In the pre-diagnostic screening, the selection of the 67 children in terms of the criteria of specific learning disabilities was guided by clues obtained from the anecdotal records of teachers, and the reports of school psychologists. Examples of such clues include the following kind of comments:

> ". . .fails to pay attention." ". . . refuses to follow directions." " . . . stubborn." ". . . lazy." " . . . resents authority." " . . .refuses to cooperate." ". . . is a non-reader but does well in arithmetic."

". . . dislikes art and ceramics but is very good with his hands." ". . . talks constantly without regard for others." ". . . is a mirror reader." ". . . has many reversals." ". . . is above average in intelligence but lacks motivation." ". . . is a word-caller." ". . . reads two years above his age-grade level but lacks comprehension." ". . . insists on a great deal of personal attention." ". . . is a discipline problem and refuses to participate in group activities." ". . . is a good speller but unable to write his spelling words correctly." ". . . clumsy." ". . . awkward." ". . . deliberately trips other children." ". . . dresses sloppily." ". . . seems to have a hearing problem." ". . . seems to need glasses." ". . . has disorganized work habits which he refuses to correct." ". . . needs limits." ". . . is a playground problem in organized games."

These particular comments were evaluated in terms of the existence of specific learning problems. It was assumed, for example, that the failure to pay attention, refusal to follow directions, refusal to cooperate, resentfulness of authority figures, ability to read above grade level without adequate comprehension, or an apparent hearing loss when health and medical records ruled out end-organ damage to the ear, might well indicate the existence of learning problems associated with difficulties in language formulation and/or auditory comprehension.

Mirror reading, ability to spell verbally and inability to write words, clumsiness, awkwardness, apparent visual problems (when health records and eye examinations ruled out eye defects), disorganized work habits, and classification as a non-reader were evaluated, for example, as possible manifestations of visual perceptual and visuo-motor problems. Children reported as discipline problems in the classroom, in need of limits, or who constituted playground problems during organized games and who also were characterized by one or more of the above difficulties were evaluated as probably evidencing hyperactive and/or perseverative behavior response patterns to overstimulating and loosely structured group activities.

The research design specified that, although all the final selectees were to have common learning and behavioral response patterns, half of the total complement of forty were to demonstrate conclusive medical and neurological evidence of injury to the central nervous system. The remaining half, while sharing the behavior and learning problems, were to have medical and neurological histories which ruled out gross evidence of central nervous system damage.

During the pre-diagnostic screening period, selection guides and clues indicating damage to the central nervous system were frequently located in school medical histories, health department records, the reports of family physicians, parent conference reports concerning their child's adjustment and learning problems, and specific notations of convulsive disorders, birth injury, accidents, or diseases. Indications of organicity reported by the psychologist or noted by psychotherapists were considered clinical evidence only if this information was associated with a compatible medical and neurological history. In the absence of such medical and neurological data the child was tentatively classified as non-brain injured and referred as such to the diagnostic staff.

Parent Conferences

Once the evaluation of the available data was completed, parent conferences were scheduled in order to explain the nature of the research project, the specific reasons why the child had been selected as a possible candidate for the program,and in order to receive parent permission for the child to participate if he later was found to be admissible.

In connection with these parent conferences, it is important to bear in mind that this particular project was designed in order to explore the learning problems of a particular group of children and to develop an appropriate instructional program. The particular individual behavior response patterns, therefore, were regarded simply as evidence of the child's learning difficulties in attempting to adjust to a classroom situation and instructional program which had not in the past provided him with the skills and techniques which might have made it possible for him to achieve academic mastery in the tool subjects. It was, for example, assumed that a hyperactive, aggressive, acting-out behavior pattern was a result of, or associated with a child's learning difficulties and not necessarily a psychopathological symtom of deep-seated emotional problems amenable only to some form of psychotherapy. A teaching, not treatment, program was contemplated in the study.

This viewpoint was clearly stated during the parent conference, and the relation of the child's particular learning difficulties to project goals was outlined as clearly as available information permitted. Problems of transportation and scheduling dates for the diagnostic examinations were worked out, and reasons for requests for parent releases for purposes of collecting additional medical information from the family physicians were clearly explained. Discussion of school, neighborhood and home problems which might develop as a result of project participation were thoroughly explored. As a result of the care taken at this point, only one parent, and she only on the advice of her pediatrician, withdrew her child's name from possible project participation.

It is the impression of the research staff that the parents cooperated just as fully as their understanding and acceptance of their child's problem in relation to the research project design permitted and that this was a direct result of a clear-cut presentation which neither minimized nor evaded discussion of their child's school problems. Furthermore, although the project goals were related whenever possible to the instructional difficulties of the child, at no time was it stated or implied that there was any certainty that the child would gain from the specialized teaching methodology; rather that it was the staff's feeling that the placement would be well worth trying.

The Family Physician

Accompanying the medical release forms provided by the parents was a letter prepared by the staff pediatrician which explained the long range instructional goals of the project to the family physician as well as indicating the nature of the diagnostic examinations scheduled for the patient. The letter included a request for any information which the physician felt might be helpful in the study. The family physician was subsequently provided with copies of the unrevised reports of the examining physicians in order that parents might turn to him for an explanation of the results of the diagnostic examinations.

Although direct participation and personal interest by the family physicians in providing medical data to the research staff varied a great deal, only one physician failed to provide the diagnostic staff with information which might have been helpful in evaluating the child.

Scheduling of Referrals to the Diagnostic Staff

After careful study of all the available medical and educational data, conferences with the parents and clearance from the family physicians, 46 of the 67 possible candidates were selected as constituting the group for intensive diagnostic study. The remaining children were held in reserve until the diagnostic studies were completed on the 46 selectees, when it would be apparent that the screening had been careful enough so that it was possible to provide the project with the 40 children necessary for the classes from the first 46 referrals.

A face sheet and flow chart of the diagnostic examinations were devised which provided a summary of the past medical and clinical history (when available) and a brief statement reporting the results of previous psychological test results. In those cases where the child was known to the School Health Service of the Department of Health, the above form was clipped to the chart for the examining physicians, who reviewed the material prior to their own examinations.

Insofar as possible, the examinations were scheduled in the following order: pediatric examination, psychological testing, neurological examination, speech and hearing testing, electroencephalogram, and psychiatric evaluation. Each specialist dictated the results of his examination the same day, or as soon thereafter as possible, and the transcription was made immediately. Thus, it was possible for each staff member, with the exception of the psychologist, to have the report of the previous physicians available at the time of the examination.

Staff Conference

Once the examinations were completed, the children were evaluated by the combined diagnostic and administrative staff as to their suitability in terms of the project design and degree of organic involvement. A preliminary evaluation was made of the possible usefulness of the proposed specialized methodology in terms of specific learning problems and behavior disorders.

Forty of the 46 children were selected: 37 boys and

3 girls. Two of the 46 children moved from Montgomery County, and an additional 4 children were excluded for the following reasons: one child demonstrated no evidence of the existence of the type of learning problems which were characteristic of the other children, and although severely disturbed, it was the consensus that his adjustment was primarily schizophrenic rather than the hyperactive aggressive acting out pattern of the other children. One child, whose reported IQ was in error, was found by the research psychologist to be so retarded that the placement in an academic group would have been unrealistic. One child, whose previous school records and related data gave every indication of meeting the pre-diagnostic selection criterion, had made so much progress in his special class placement the preceding year that he no longer needed the special class placement and was transferred to a regular class. One child, who met all the selection criterion and qualified in every other way, was rejected by the staff because not only would he have been the youngest child in the entire group, but he had had no previous public school experience. His placement at that time was in a residential treatment center, and it was the concensus of the staff that the combination of these reality factors argued against transfer to a full-time academic program in the public schools.

Individual Diagnostic Examinations

This section of this chapter consists of the individual examination reports of the pediatrician, neurologist, audiologist, psychiatrist, and psychologist. The reports have been arranged by discipline rather than by child since it was felt that this method of presenting the medical and clinical data provided an over-all view of the diagnostic patterning of the total group from the standpoint of each discipline. In each case, the reports are preceded by an outline of the examination procedure and conclude with a general statement as to what was considered to be the most important aspects or implication of the study from the standpoint of each particular discipline.

This presentation of diagnostic and clinical data was agreed upon by the research staff after many other methods had been considered and rejected as unsatisfactory. What finally became apparent was that in attempting to revise the raw data in line with the traditional methods of reporting case history material, a number of the most important aspects of the research project were being left out.

These aspects included the following:

1. the research staff's own conflicting opinions and disagreements concerning the interpretation of the results of the diagnostic examinations;

2. the learning experience they shared in working through these conflicts in order to maintain the integrity of the research design,

3. the gradual revision of some of the examination procedures and methods of recording medical and clinical impressions as a result of the staff's growing awareness and agreement of the clinical uncertainties in establishing brain

injury as a definitive diagnostic classification;

4. the staff's final decision, at the termination of the diagnostic period, to restate the research problem in line with their consensus that, while the 40 selectees did demonstrate, in varying degrees, the same kinds of specific learning problems and hyperactive behavior pattern, no clear-cut line of demarcation could be established between those who were brain injured and those who were emotionally disturbed.

The decision to make the raw data available is indeed a tribute to the individual integrity, maturity, and professional objectivity of the members of the diagnostic staff. This is in contrast to the more popular practice of eliminating contradictory material and differences of opinion in favor of publishing smoothly edited case histories, thus creating illusion of perfect accord and harmony within the team.

It can be predicted with considerably accuracy that from whatever personal bias or professional viewpoint this material is studied and evaluated, substantiating evidence supporting that bias or viewpoint becomes available as a result of selected aspects of the raw data itself. This opportunity is deliberately offered the reader, in preference to reporting the research staff's own personal opinions and interpretations of what they thought was significant to the project problem and their own personal discipline.

As has been previously indicated, there has been no attempt to make it appear as though there was complete, or even general, agreement among the physicians as to the specific diagnostic classification considered appropriate to each of the individual children. What will become clear after even the most cursory reading of the reports from any one discipline is the similarity in the developmental patterns of these children. Whether they demonstrated clear-cut evidence of organic damage to the central nervous system or symptoms of what has been frequently referred to as "minimal" brain injury or behavior and learning problems similar to those of the brain injured child but with no evidence of minimal or any other kind of central nervous system damage, their developmental histories were startlingly similar.

It appears particularly appropriate at this point to refer to the work of Masland, Sarason and Gladwin who, in reporting on other significant studies in this general problem area, make the following statement concerning the need for detailed case histories on children who demonstrate this particular kind of problem in differential diagnosis.

> ". . . the work of Strauss is perhaps the best example we have of the fruitfulness of an approach which is based on the integration of concepts in developmental neurology, diagnostic criteria of brain injury, and detailed program planning. . . . Although the validity of some of the diagnoses of minimal brain injury based on Strauss' criteria can be questioned, it should not be overlooked that Strauss' concertions have given rise to ingenious educational procedures and an environmental structuring which undoubtedly have had positive therapeutic effects. It is likely that there are cases where one would feel that a diagnosis of minimal brain injury by Strauss' criteria was unwarranted but where the child's response to the program planned for him, while it cannot 'prove' the correctness of the diagnosis, certainly cannot be used as evidence against it. Unfortunately, we do not have the kind of detailed case reports which would allow one to gauge the frequency of this type of case. If

> we had such comprehensive case descriptions one could also get a better idea of the role of the 'therapeutic milieu' in producing behavioral changes regardless of the presence or absence of brain injury. For example, we obviously have been impressed with the educational techniques and over-all therapeutic approach designed by Strauss and Lehtinen. But one cannot avoid raising the following question: To what extent would children with no brain injury but with severely disabling learning difficulties and/or behavior problems benefit from the kinds of programs adapted to the presumably peculiar needs of brain injured children? (1, pp. 366-367).

It is the belief of the research staff that this pilot study and demonstration provide at least a partial answer to this question, that it is a favorable one, and that the following detailed case reports may help in the task of working toward the solution to some of the questions raised by Masland, Sarason, and Gladwin.

The Population: A Case Study

In the opening paragraph of this chapter it was stated that there would herein be recorded the unrevised individual diagnostic and clinical reports of the diagnosticians. Since these are oftentimes exceedingly lengthy and to include them all at this point would interrupt the reader, only one case study will be presented. Additional studies (10) will be found in Appendix A. Information on the children continued to accrue over the months and there thus appears in the data which follow, some information which was not available at the staff conference when the child's admission was considered. The initial data can be ascertained, however, from the dates which are indicated, for example, after each psychological test. The data are presented below in the general order in which the child received the diagnostic examinations, i.e., psychology, pediatrics, neurology, etc. The case studies presented in the pages which follow and in Appendix A constitute the material from which the composite earlier presented in this chapter was drawn and characterizations of the subjects finally selected as participants in the demonstration pilot study.[1]

Child No. C-1-6

Psychological Evaluation

Stanford-Binet, Form L (Pre-test) (4-2-57)

CA--8-3

MA--6=3

IQ--76

The IQ is at the lower limits of the slow learning range. The mental age is 6-3 years, with a range of performance from a basal age of IV to a ceiling of IX. These results are quite similar to those obtained a year previously by another psychologist when a mental age of 5-2 years was obtained, IQ 70.

In the present examination all items were passed at the year IV. C-1-6 was unable to repeat 4 digits which is expected at Year IV-6. At Year V he was unable to fold a triangle after being shown how by the Examiner or to repeat simple sentences. At Year VI he was unable to copy a bead chain from memory, differentiate essential aspects of a situation from nonessential, and showed poorly developed number concepts. When asked to give the Examiner 3 blocks he did so, but could not do the same for 5 or 9 blocks. He could count by rote, but was unable to count concrete things correctly. He started to play with the blocks, making a tower, and it was somewhat difficult to get him away from this. At Year VII he was unable to see the absurdity in pictured situations, see similarities, repeat 5 digits, or copy a diamond. When asked to draw a diamond he produced something resembling a rectangle, called it a boat, and proceeded to elaborate this concept. At the Year VIII level he passed only one item, which involved comprehension of a concrete situation. All items were failed at the Year IX.

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[1] Appendix A does not contain the total balance of 39 case studies. Several parents withheld written permission to include the case data on their children. In deference to parent attitudes the authors have not included these data. The additional material would not, however, change the characteristics of the group in any significant manner from that presented in the monograph. The case studies of one entire group have been included to provide the reader a complete understanding of the nature of the children in the total study.

Stanford-Binet, Form M (Post-test) (5-22-58)
CA--9-5
MA--7-0
IQ--74

Intelligence is at the borderline between the slow learning and retarded range. The range of performance is from a basal age at Year VI to a ceiling at Year IX.

At the Year VII two items were passed. He was able to give the number of fingers, and could see the absurdity in pictorially presented materials. He could not reverse 3 digits, however, and memory for sentences was extremely poor. He could not count the number of times a block was tapped.

Four items were passed at the Year VIII level. Comprehension of verbally described situations and problems was good, and he could see the similarity between two things. He could name the days of the week in order, and give the day that preceded certain specified days. He could not resolve verbal absurdities, and opposite analogies was too difficult.

All items were failed at the Year IX.

Ammons Full-Range Picture Vocabulary Test (12-2-57)

CA--9-0

MA--8-0

The mental age obtained on this test was 1.5 years above that obtained on the Stanford-Binet. The following words, which the average child of 9-0 is expected to pass, were failed: customer, sale, meal, broadcast, safe, protection, and cleanliness.

Goodenough Intelligence Test

Pre-test (11-25-57)	Post-test (5-21-58)
CA--8-11	CA--9-5
MA--6-3	MA--6-9

Both drawings were crudely drawn, with odd, peanut-shaped bodies, stick legs, and elongated necks. Both drawings were concerned with a figure doing some activity. The first was: "A man sawing some two by fours." The second was "A man writing." In the second figure the arms were in two dimensions, and fingers were drawn. The facial detail was more complete. Although the over-all impression is better, the actual scorable details result in only a six-month difference in mental ages between the two tests.

Block Design and Coding from WISC (4-2-57)

	Raw Score	Scaled Score	Test Age Equivalent
Block Design	1	3	4-10
Coding	4	2	4-10

On the Block Desing Test, Design A was passed on the second attempt. From that point on the colors seemed to be confusing. Inappropriate colors were used, and he could not construct the figures.

On the Coding Test, Form B, 21 symbols were attempted, but 17 were errors.

Both of the above tests were well below the level one would expect on the basis of the over-all mental age of this child.

Bender-Gestalt Test

The pre-test drawings (4-2-57) were very poorly conceived and executed. There were 23 errors in all, with 4 drawings categorized as immature, 5 dissociations, 1 closure, 4 incorrect elements, 1 unrecognizable, 3 distorted angles, 4 rotations, and 1 compression. There was little change in the post-test (5-21-58) where 23 errors were made. One was categorized as concrete, 3 perseverations, 4 dissociations, 1 closure, 5 incorrect elements, 3 distorted angles, 1 rotation, 3 enlargements, and 1 disproportion.

Syracuse Visual Figure-Background Test

In the pre-test (11-19-57) there were nice correct responses to the figure, no background responses, and

1 perseveration. In the post-test (5-21-58) performance was much poorer, with 6 correct responses to the figure, 3 background responses, and 2 perseverations.

Tactual Motor Test (11-19-57)

This child was unable to draw a single figure. The addition of a thumbtack background seemed to make little difference. He seemed quite certain that he knew what was behind the screen, but each drawing was incorrect. When feeling the diamond his face suddently lighted up, and he said: "I know what that is! It's a box."

Marble Board Test (10-3-57)

On the Marble Board 1, S looked at the board, then said: "I've got the shape of it. You put one in the middle, and one in every square with a marble. His drawing was constructed in the same manner, showing rows of filled-in spaces. When presented with Marble Board 2, he said: "What is it? It's a "Z"! He then proceeded to make a backwards "Z." His drawing, however, was of three sides of a square.

Vineland Social Maturity Scale

Pre-test (11-19-57)		Post-test (5-1-58)	
Total Score	74	Total Score	75
Age Equivalent	9-0	Age Equivalent	9-4
Social Quotient	101	Social Quotient	103

There are few changes between the pre- and post-test interviews. S can now make telephone calls, does small remunerative work, and does routine household tasks, things that he could not do at the beginning of the year. In general, however, his rate of social development has remained quite constant.

Summary

Intelligence is at the borderline between the slow learning and retarded range. The rate of intellectual development is quite consistent over the course of the last 3 years, as may be seen in the similar test results obtained at yearly intervals. The main intellectual weaknesses on the Stanford-Binet are to be found in those areas requireing sustained attention, ability to reproduce designs, abstract abilities (seeing similarities and differences), and ability to differentiate essential from non-essential elements. Relative strengths are to be found in areas requiring comprehension of concrete situations and vocabulary. On tests requiring visual-perceptual ability, such as the two subtests from the WISC, the Bender-Gestalt, and Syracuse Visual Figure-Background Test, performance was quite poor. Both subtests from the WISC were at a level considerably below the mental age on the Stanford-Binet. No improvement was noted on the Bender-Gestalt reproductions, and the performance was actually poorer in the post-test period on the Syracuse Visual Figure-Background Test, where there were more perseverative responses, fewer correct responses to the figures, and more background responses. The rate of social development, as shown on the Vineland Scale of Social Maturity, was approximately the same, with relatively few changes occurring over the course of the year.

Pediatric History and Examination

Problem

The history was obtained from both parents who were seen together. The problem was stated to consist of three parts:

1. Physically, he seems more awkward than other boys of his own age. His coordination is lacking some.

2. One leg is shorter than the other and this discovery apparently was made last year when he was examined after having complained of foot pain. Measurements were taken at this time and the difference was noted. In addition, one arm is and has always been large in circumference and there is this mottling of the skin on the arm, leg, and buttocks. Reference was made to his awkwardness by stating that he skips on only one foot at a time and goes down a flight of steps only one step at a time, lacking the automatic movements which would be required for such an act.

3. Brain damage. He has complete expressive aphasia and the diagnosis of brain damage apparently came about as a result of a neurological examination.

It should be stated here that the parents have been to innumerable physicians and clinics, inasmuch as the father is in the service and has been referred, depending on his assignment, to various specialized clinics. As a result, they have reports which they carry with them and have a pretty good working knowledge of the type of problems which their son presents. The mother, who is pregnant, was more outgoing and seemed to be less serious than was her husband. He seemed to be very stable and serious and tried to pinpoint all of his answers as best he could.

It was stated that the mottling of the skin was first noted at about 3.5 years of age. Physicians were consulted for this and the difference in the arm circumference was discovered then. At this time he was not yet talking but the parents were not concerned about it. In 1953, while in nursery school (when he was 4 years of age) he still did not talk. Speech had not been stimulated as had been anticipated, by enrolling him in nursery school. In 1954, EEG's (electroencephalogram) were done and were said to have been normal. Speech therapy was begun and the term "aphasia" was used for the first time. The speech therapy apparently had some initial success. In 1955, when the family came to this area, C-1-6 began to see a speech therapist and has continued to work with her under the supervision of an audiologist. The boy was given a neurological examination in the spring of 1956 at which time the term "brain damage" was used for the first time in explaining the etiology of his condition.

Present status

His schooling in general is said to be coming along nicely although slowly. He is talking more satisfactorily now. He is beginning to read and beginning to do arithmetic. He apparently is being worked with a great deal at home and his writing is definitely improving. He has never had any difficulty making his wants known.

Family history

1. Mother's mother is living and well.
2. Mother's father died of a heart attack.
3. Father's mother died of cancer of the esophagus.
4. Father's father died of pneumonia.
5. Mother has one brother and one sister living, and well.
6. Father has one brother and one sister living, and well. One sister died of leukemia when she was about 8 or 9 years of age.

A cousin of the father's mother is said to be feeble-minded and to be institutionalized.

Family background

Father.--Thirty-eight years of age. Ulcer recently acquired and being tested medically. He has a B.S. and did one year of post-graduate work. His interests are mainly with optics and photography. He plays the piano and organ and is a high-fi enthusiast. His personality was described as "regressive," introspective and introverted. He actively participates in raising the children.

Mother.--Thirty-nine years of age. Is pregnant and is 3 weeks from confinement. She completed high school and did secretarial work before her marriage. Amongst her interests are ballet, having taught it for awhile. Her other interests are her home and the children. Her personality was described as being less introverted than her husband (who was the one who actually answered this question). She is more interested in contact with people and is a lot better read than her husband.

Marriage.--They have been married for 14 years. It has been a compatible, fairly happy, normal married life. It is a second marriage for the mother. The responsibility for the home and the raising of the children is a mutually shared responsibility. They are both of the same religion.

Siblings.--A sister, 12 1/2 years of age. She is aware of her brother's situation and tries to treat him as normally as possible. A brother, age 2. C-1-6 is said to be very fond of the sister and is said to be very affectionate by nature. Because of the younger brother's age and the frequency with which he gets into C-1-6's things and into his hair, in general, they are usually separated but once in a while when this does occur C-1-6 will explode.

Maternal history during pregnancy and delivery

The mother is pregnant now for the fourth time. She was 31 years of age when she delivered C-1-6. She received prenatal care after the third month of her pregnancy. He was a desired baby. He was born 14 days overdue according to her calculation. Apparently the pregnancy was not remarkable. There were no unusual emotional or physical strains, no medications and no X-rays. There was a very short labor period and it is extremely interesting to note that apparently the baby was held back. He is said to have had a large head. He weighed 7 pounds, 8 ounces. He was seen during the first 24 hours. He was breast fed for the first dew days only until a viral infection of the mother seemed to make it advisable to stop nursing him. He thrived on a formula, sucked well; there were no GI symptoms in early infancy. He slept well and quite a bit of the time. There was no history of head-banging or rocking or thumb-sucking. Solids were started at 3 or 4 weeks of age. He was said to be a hungry baby and thrived.

Past medical history

DPT and smallpox vaccinations received during first year of life, and subsequently the three Salk immunizations. Mumps at 3 years of age, chickenpox at 4 years of age, measles at the age of 6. Except for occasional colds and other febrile illnesses, the remainder of the medical history is not remarkable.

Developmental history

He started counting last year. He is said to be right-handed. He was toilet trained quite late and progress was slow. He did not achieve bladder control until 4 or 4 1/2 years of age and bowel control at approximately 5 years of age. His attention span is very short and he is beginning to make positive progress in school. He prefers boys of his own age or younger. There is no difficulty sleeping, he can sit through TV, he goes to regular Sunday School. He loves to swim and is fearless of water. He plays baseball, rides a two-wheeler bicycle alone. He likes to play cowboys and use guns. He has his own record player, likes to be read to and to read. He likes to play games with other people. The mother works with him at home under supervision in order to improve his speech. He used a spoon and a fork well and at the moment is learning how to use a knife. He can dress himself but does have difficulty with his shoe laces. When punished he blows up quickly and violently but only for a short duration. He is discouraged from fighting, or at least was discouraged from fighting and now, apparently, does not know how to fight back. When questioned about how he handles hostility, the mother said he is more likely to be "the St. Bernard type." He is said to be a lot less uninhibited in making new friends. He does not handle frustration too well. When thwarted he will sort of explode and cry out.

Past medical history notation

A neurological examination in 1956 revealed a high probability of a vascular anomaly of the left cerebral hemisphere. It was felt to be of the large vessel type rather than capillary in nature. The localization was considered to be probably in the superior temporal parietal region.

The child walds with a minimal right hemiparetic gait. He is clumsy bilaterally. There are no cerebellar signs. Tone is slightly increased on the right side.

Physical examination

Blood pressure 105/70.

General appearance.--C-1-6 has puffy eyes, and is a big boy for his age. He is chubby, friendly, and sympathetic looking. In the examining room he kept saying "What's this - What's this?" for everything he picked up. He speaks deliberately and will say words that he has been taught even though they do not apparently make much sense. When asked about three wishes he replied that it was a secret and he couldn't tell. When the four o'clock siren was heard it disturbed him markedly. He said that it was his little brother (who was with his mother in the waiting room) who was frightened by the siren. Although he undressed without too much difficulty, later, in getting dressed, he was unable to tie his shoe laces. He kept asking the examiner to tie them and to do other things as well. It may be that the subject expects not to be able to do them by himself. His posture and gait were grossly normal.

Skin and mucous membranes.--C-1-6 has vascular anomalies of the left hand and arm and the right thigh and right leg. The left arm is bigger than the right and the right leg and foot are smaller than the left. Lymph nodes: not remarkable. Head: position and shape not remarkable. Face: there were no facial tics apparent. Ears: the external ear was normal. There were no discharges or mastoid tenderness. Hearing was grossly normal and otoscopic examination was negative. Eyes: extra-ocular movements were normal. There was no ptosis of the lids or strabismus. Pupils were round and regular and reacted to light. Vision was grossly normal. Fundi were negative. Nose and sinuses: not remarkable. Mouth and throat: not remarkable.

The teeth were in good condition, numbering twelve on top and twelve on bottom. The tonsils were still present. The palate was of normal contour. The pharynx was negative. Neck: there was no nucha rigidity or any masses palpable. The thyroid was not enlarged. The trachea was in the midline. There was no evidence of venous engorgement. Chest: the shape of the chest was somewhat concave, symmetrical with normal respirations. The lungs were clear to palpation, percussion and auscultation. The heart was clinically not enlarged. The point of maximum impulse was in the sixth interspace in the midclavicular line on the left. No murmurs were audible. Femoral and radial pulses were normal. Abdomen: abdomen was somewhat protuberant. There were no masses palpable. The liver, spleen and kidneys were not enlarged. Genitalia: normal male external genitalia. Extremities: right extremity measured 32 inches and the left extremity 31 inches in length.

Neurological Examination

Cranial nerves

The first cranial nerve was not tested. Second cranial nerve--the fundi are normal. There are no abnormalities of the vessels present. The discs are well outlined. The fovea are normal. Third, fourth and sixth cranial nerves--the extra-ocular movements are intact. No nystagmus is present. Fifth cranial nerve--the boy was able to chew without difficulty. There is no sign of sensory loss on either side. Seventh cranial nerve--muscles of facial expression are all normal. Eighth cranial nerve--air conduction is greater than bone conduction. The tuning fork is heard without difficulty. There is no lateralization. Ninth and tenth cranial nerves--the uvula was in the midline. The vocal cords were not seen. The boy was able to swallow without difficulty. Eleventh cranial nerve--the boy is able to shrug his shoulders without difficulty. Twelfth cranial nerve--the tongue protrudes in the midline. There is no sign of atrophy or fasciculations.

Sensory

Pin prick, vibratory, position, touch, stereognosis were all well performed. He has good two-point discrimination and pin prick localization. He is able to identify his body parts without any great difficulty although he seemed to hesitate a little when it came to which was his right and which was his left. However, once he had that established in his mind he went right ahead and identified one side against the other without difficulty. This boy does not have any signs of apraxia. He understood the majority of the commands that were issued to him and carried them out with alacrity. When asked to identify parts of the examiner's clothing, he was able to identify all of them and usually gave a correct response. When it came to identifying things with stereognosis, he misnamed thimble. When corrected he went back and gave the correct name for it. He appears to be able to do things very well insofar as the parietal lobe is concerned.

Reflexes

Reflexes were brisk throughout. No pathological reflexes were present.

Motor

The boy seems to have moderately good strength.

Cerebeller

The boy was able to do finger-to-nose and heel-to-shin tests without any difficulty. Diadochokinesis was well performed. He could walk without staggering.

Station and gait

Romberg was negative. He could walk on his heels and on his toes without any difficulty.

Movements

No extrapyramidal movements were noted. He had no choreiform movements at any time.

Comment

C-1-6 appeared anxious to cooperate with the examiner. His drawings of a house, boy, and girl were somewhat primitive and experienced extreme difficulty in writing his name. There was some evidence of perseveration in his attempt to complete the drawings.

Electoencephalogram

Attitude and condition of patient: alert, cooperative. Fundamental frequency: is slow. Slow waves: around 4.5 to 5 per second dominate the record, at time more in the bi-occipital derivations. Fast waves: except of muscle origin, are not prominent. Amplitude characteristics: high voltage (150 microvolts); regular modulation. Hyperventilation: generates generalized 2 to 3.5 per second waves; persists long after the cessation of deep breathing. Impression: generalized abnormal EEG. The slow activity is somewhat more generalized than in previous record.

Speech and Hearing Evaluation

Language and speech development

C-1-6 had been diagnosed as a child with expressive aphasia. Parents had never questioned the child's ability to hear or to understand language. In retrospect they feel that he never vocalized freely as an infant and did not experiment with vocal play. He developed an elaborate gesture language. At age 5 he had no speech. He was taken to the speech clinic where the therapist began training with picture cards. The child had the ability to mimic the word but there was no spontaneous recall or carry-over. He associated the syllables with the cards rather than the idea of verbal communication. As a result of training he began to add a great many words and also began phrasing, but language sequence was his greatest problem.

General behavior observations

The child came willingly to the test situation. He was friendly, cooperative, and displayed a great deal of social maturity.

Oral examination

Oral examination is unimpressive. There is good length and lift to the velum and also good control of the articulators.

Articulation

C-1-6 has some articulation errors but they are minimal. The most persistent and consistent errors are an f substitution for th, and sh substitution for ch, br for dr, and pr for cr and tr. L blends are also unstable. There is some vowel prolongation.

Voice

Voice is of good quality. There are many changes in rate and pitch. There tends to be a sing-song quality and a different rate pattern. There are times when his utterance is almost compulsive. This occurs when he gets excited, at which time his speech tends to get labored and articulation is slurred. It is as if he does not have control of the rate of speech.

Propositional speech

C-1-6 has shown much progress in his ability to express himself freely. He now talks in complete sentences, using complex sentences as well as extensive vocabulary. He is now using words such as pause and recognize. His speech is characterized by the marked changes in rate and pitch which are described above. There is a great deal of perseveration which takes the form of repeating the same sentence or phrase several times. For example, when asked to do something, he commented "never can do that, never can do that, never can do that, never can." This happens many times during a conversation. There were occasional lapses into incorrect grammatical usage, such as the wrong pronoun or the wrong verb tense. He can repeat long sentences accurately. His auditory memory is improving steadily. He reads with reluctance and is somewhat defensive about his reading.

Hearing

A PureTone audiogram was done. C-1-6's hearing is well within normal range. However, it may be significant that he had some difficulty in localizing which earphone he was hearing from. He was able to repeat spondee words and a standard list of PBK words with ease and accuracy.

Comment

The subject's basic problem is one of organization and recall of expressed speech. There are problems in rate and pithc of speech.

Psychiatric Examination

C-1-6 made a real effort for the entire hour to be understood but at times he lapsed into unintelligible syllables. He had a short attention span, but it was sufficiently long to tell a ten-minute story about cowboys and Indians. In telling this story and in playing with the puppets,the child destroyed the Indians and a witch, roles that were taken by the examiner. His puppet play consisted of expressing interest in puppets; he was himself and the examiner was the witch. The witch was hanged.

The subject was interested in BoBo. However, his punches were very mild as though he were too afraid to hit out. His coordination was fair for this activity.

He spent most of the hour shooting several guns. For this activity his stance was very realistic and he three himself into the shooting. He appeared confused when asked his three wishes. When pressed he changed the subject. No answer was received. He said heliked to draw, and quickly drew a boy hitting BoBo the Clown with obvious pleasure and relish. When asked to sign his name, he said "I can't" but followed the remark with a creditable signature.

Psychiatric re-evaluation

C-1-6 was his usual friendly self who put on a serious face "to act like a grownup and behave myself." In the playroom, he turned at once to the guns and could have continued with this activity for the full hour. When asked if all the shooting meant that he was unhappy he replied, "They are too busy." After several pauses and changes of the subject, he replied that he went to Sunday School with his father.

Conversation with mother: The mother feels that the child's progress can be summed up by the phrase "more confidence." She went on to say that he was no longer afraid of dogs. Previously, he had a great fear of them. His mother felt that the increase in his ability to communicate had much to do with this change in his attitude.

Although the child still asks questions he knows the answers to, the parents feel that C-1-6 has made many strides toward independent behavior in other directions. The mother was at a loss to remember any incident which would lead him to be more than ordinarily irritated at one or more members of the family.

The mother was relaxed, concerned, intelligent, and impressed with the child's progress.

Prenatal, Natal, and Postnatal Data

Part of the diagnostic period included an effort to understand what factor or factors might have been involved in the development of the children included in this study. Thus, an attempt was made to study the prenatal, natal, and postnatal data insofar as they were available to the diagnosticians. This was done on the assumption that whatever the causal factors to hyperactivity are, they must be operating from the time of conception through birth and immediately following. A study was undertaken[1] to examine the available clinical data by copying verbatim, data from hospital obstetrical charts and new-born charts of each of the mothers and the children in the study. Those data which are missing indicate either home deliveries or else no record at all was available to the research personnel. As the reader can see from Tables 1 through 6 inclusive, there are more blank spaces than reported data. Many times even the same hospital was inconsistent in the nature of the information which was recorded. Obviously this kind of retrospective study has many defects. What is needed is a perspective in recording information which could later then be carefully studied and correlated. In this way, among others, factors which are influential in the production of congenital abnormalities could be isolated and viewed in terms of their relative importance. In the absence of such a forward looking plan on the part of hospital administrators and physicians, the data insofar as they may have value in pointing up a problem are presented here for consideration.

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[1] Following clearance from parents and family physicians, these entire data were collected by Milton Glatt, M.D., pediatrician on the study staff during its duration. All data were copied from hospital records personally by Dr. Glatt. It is his notations which appear in Tables 1 through 6, inclusive, in this chapter.

The data included in Table 1 are all essentially negative. This table indicates the respective ages of father and mother at the time of the birth of the subject and presents data regarding previous pregnancy history of the mother. Data were available for 28 of the 40 children. The average age of the mother was 27.8 years (N = 28); of the fathers, 30.4 years (N = 26). For the group on whom data were available there are recorded 27 previous pregnancies involving 15 mothers. The range is from 1 to 3 previous pregnancies. Five previous abortions are noted in the case of 3 mothers; 1 previous stillbirth in 1 mother. Two premature births are reported for 2 mothers. No neonatal deaths are reported in the mothers of this group. None of these figures are noteworthy in themselves. In combination on a relatively normal picture is presented. The data regarding stillbrith, premature deliveries, and previous abortion are considerably more favorable for this group of mothers than those reported by Hopkins, Bice, and Coulton (2) in their survey of birth records of New Jersey mothers of cerebral palsy children.

Table 2 presents gestation information of the mothers in the experimental and control groups (N = 28). Data obtained are essentially negative. The average length of gestation in weeks reported for 27 mothers was 39.3. Complications during the gestation period were reported for 19 mothers. Ten of the reports were negative in character. Complications which arose during pregnancy and reported were as follows: 1, threatened abortion; 3, spottings; 3, edemas; 1, pre-eclampsia one week

TABLE 1

PRENATAL DATA REGARDING THE MOTHERS AND FATHERS OF THE EXPERIMENTAL AND CONTROL SUBJECTS
(N = 28)

Subject	Age (In Years)		Total Number of Previous Pregnancies	Number of Previous Abortions (and Time)	Number of Previous Stillbirths	Number of Premature Births	Number of Neo-natal Deaths
	Mother	Father					
C-2-2	29	33	2	2 (Before the 5th month)	$\bar{0}$	$\bar{0}$	$\bar{0}$
E-1-1	33	36	1	$\bar{0}$	$\bar{0}$	$\bar{0}$	$\bar{0}$
E-1-8	31		$\bar{0}$[a] Had difficulty in becoming pregnant. Appendix and ovarian cyst removed.	$\bar{0}$	$\bar{0}$	$\bar{0}$	$\bar{0}$
E-1-4	28	28	$\bar{0}$	$\bar{0}$	$\bar{0}$	$\bar{0}$	$\bar{0}$
C-1-6	31	29	b				
C-2-3	30	30	$\bar{0}$	$\bar{0}$	$\bar{0}$	$\bar{0}$	$\bar{0}$
E-2-10	25	28	$\bar{0}$	$\bar{0}$	$\bar{0}$	$\bar{0}$	$\bar{0}$

TABLE 1--Continued

Subject	Age (in Years)		Total Number of Previous Pregnancies	Number of Previous Abortions (and Time)	Number of Previous Stillbirths	Number of Premature Births	Number of Neo-natal Deaths
	Mother	Father					
E-1-3	31	34	2				
C-1-9	29	31	2	$\bar{0}$	$\bar{0}$	$\bar{0}$	$\bar{0}$
E-2-6	32	29	1	$\bar{0}$	$\bar{0}$	$\bar{0}$	$\bar{0}$
C-2-1	27	34	$\bar{0}$	$\bar{0}$	$\bar{0}$	$\bar{0}$	$\bar{0}$
C-2-4	25	28	3	$\bar{0}$	$\bar{0}$	$\bar{0}$	$\bar{0}$
C-1-2	26	30					
E-2-7	22	25	1	$\bar{0}$	$\bar{0}$	$\bar{0}$	$\bar{0}$
E-2-2	29	33	1	$\bar{0}$	$\bar{0}$	$\bar{0}$	$\bar{0}$
C-2-6	18	25	$\bar{0}$	2 abortions at 6 weeks of gestation. Between 1st and 2nd, then 2nd and 3rd child	$\bar{0}$	$\bar{0}$	$\bar{0}$

TABLE 1--Continued

Subject	Age (in Years)		Total Number of Previous Pregnancies	Number of Previous Abortions (and Time)	Number of Previous Stillbirths	Number of Premature Births	Number of Neo-natal Deaths
	Mother	Father					
E-2-1	20	20	$\bar{0}$	$\bar{0}$	$\bar{0}$	$\bar{0}$	$\bar{0}$
C-2-8	27	31	1	$\bar{0}$	$\bar{0}$	$\bar{0}$	$\bar{0}$
E-2-8	32	32	2	$\bar{0}$	$\bar{0}$	$\bar{0}$	$\bar{0}$
C-1-4	25	30	1	$\bar{0}$	$\bar{0}$	$\bar{0}$	$\bar{0}$
C-1-5	26		2	$\bar{0}$	$\bar{0}$	$\bar{0}$	$\bar{0}$
C-1-7	37	42	$\bar{0}$	$\bar{0}$	$\bar{0}$	$\bar{0}$	$\bar{0}$
C-1-1	32	33	$\bar{0}$	$\bar{0}$	$\bar{0}$	$\bar{0}$	$\bar{0}$
E-2-3	26	26	1	$\bar{0}$	$\bar{0}$	$\bar{0}$	$\bar{0}$
E-1-5	23	29	$\bar{0}$	$\bar{0}$	$\bar{0}$	$\bar{0}$	$\bar{0}$

TABLE 1--Continued

Subject	Age (in Years)		Total Number of Previous Pregnancies	Number of Previous Abortions (and Time)	Number of Previous Stillbirths	Number of Premature Births	Number of Neo-natal Deaths
	Mother	Father					
E-1-9	25	27	2	ō	ō	1	ō
E-1-6	26	32	2	1 First trimester	ō	ō	ō
E-1-2	34	36	3	ō	1 Impacted shoulders	1	ō
Total			27	5 (for 3 mothers)	1 (for 1 mother)	2 (for 2 mothers)	0
Range	18-37	20-42	0-3				
Unknown	6	2	2				
Average	27.8	30.4	-1				

[a] ō = recorded as negative.

[b] Blank spaces indicate no hospital record notation.

TABLE 2

GESTATION DATA REGARDING MOTHERS OF CHILDREN IN THE EXPERIMENTAL AND CONTROL GROUPS
(N = 28)

Subject	Length of Gestation (in weeks)	Complications of Gestation	X-rays During Gestation	Medication During Gestation
C-2-2	LMP[a] 7/17/48 EDC[b] 4/24/49 (3/24/49) 33 weeks	Threatened abortion (spotted until 10/26) 20 pounds weight gain	ō	Stillbesteral
E-1-1	LMP 7/28/49 EDC 5/4/50 (5/2/50) 40 weeks	ō 18 1/2 pounds weight gain	ō	ō
E-1-8	LMP 5/21/47 EDC 2/28/48 (1/6/48) 32 weeks	ō 19 pounds weight gain	ō	ō
E-1-4	LMP 9/2/49 EDC 6/9/50 (6/16/50) 41 weeks	ō 20 pounds weight gain	ō	ō
C-1-6	(12/20/48)			
C-2-3	LMP 11/15/46 EDC 8/22/47 (9/4/47) 42 weeks	ankle edema		

TABLE 2--Continued

Subject	Length of Gestation (in weeks)	Complications of Gestation	X-rays During Gestation	Medication During Gestation
E-2-10	LMP 7/4/48 EDC 4/11/49 (3/30/49) 38 weeks	nausea vomiting edema pre-eclampsia 1 week prior to delivery	ō	
E-1-3	39 weeks			
C-1-9	LMP 7/12/47 EDC 4/19/48 (4/26/48) 40 weeks	ō	ō	ō
E-2-6	LMP 1/18/49 EDC 10/25/49 40 weeks	ō 20 pounds weight gain	ō	ō
C-2-1	LMP 10/1/48 EDC 7/8/49 (6/25/49) 39 weeks	ankle edema 23 pounds weight gain (ovarian cyst removed in 1948)	ō	ō
C-2-4	LMP 4/25/48 EDC 2/1/49 (2/17/49) 42 weeks	fell down steps in November '48 hip bruise no spotting	ō	ō
C-1-2	LMP 12/15/47 EDC 9/22/48 (9/17/48) 39 weeks			

TABLE 2--Continued

Subject	Length of Gestation (in weeks)	Complications of Gestation	X-rays During Gestation	Medication During Gestation
E-2-7	LMP 10/24/49 EDC 8/1/50 (8/11/50) 41 weeks	ō	ō	ō
E-2-2	LMP 8/19/48 EDC 5/26/49 (4/21/49) 35 weeks	ō mother had rheumatic fever as child	ō	ō
C-2-6	LMP 9/7/49 EDC 6/14/50 (7/13/50) 44 weeks	Spotting in 2-3 months. Confined to bed for 2 weeks. No treatment. 7/14/50 - fracture of right fibula following fall.	Yes at term Cephalo-pelvic dispro-portion	ō
E-2-1	LMP 5/27/48 EDC 3/4/49 (2/18/49) 38 weeks	mild anemia 10.5 gm. hemoglobin	ō	ō
C-2-8	40 weeks	ō	ō	
E-2-8	LMP 11/15/48 EDC 8/22/49 (8/13/49) 39 weeks	nausea and weight gain "blues"	ō	ō
C-1-4	LMP 9/18/49 EDC 6/27/50 (7/12/50) 42 weeks			

TABLE 2--Continued

Subject	Length of Gestation (in weeks)	Complications of Gestation	X-rays During Gestation	Medication During Gestation
C-1-5	LMP 5/1/48 EDC 2/1/49 (2/13/49) 42 weeks	hyperemesis		? for hyperemesis
C-1-7	LMP 4/24/49 EDC 5/1/50 40 weeks	? of endocrine treatment - not confined		
C-1-1	LMP 4/20/48 EDC 1/27/49 (2/8/49) 42 weeks	? of spotting not on chart from mother's history	ō	ō
E-2-3	LMP 10/20/49 EDC 7/20/50 (7/20/50) 40 weeks	ō	ō	ō
E-1-5	LMP 6/25/48 EDC 4/2/49 (3/17/49) 38 weeks	twins	fifth month for diagnosis	ō
E-1-9	LMP 1/28/48 EDC 11/4/48 (11/1/48) 40 weeks	ō		ō
E-1-6	LMP 4/24/49 EDC 1/31/50 (1/3/50) 36 weeks	leucorrhea (fungous infection)		ō
E-1-2	LMP 2/13/48 EDC 11/20/48 (11/13/48) 39 weeks	Spotting first 2 months Scarlet fever in second month	ō	ō
		Comments on 19 mothers	Two for 2 mothers	One plus, 1 in question

[a] Last menstrual period.

[b] Expected date of confinement.

prior to delivery; 2, "falls"; 1, depression; 1, mild anemia; 1, hyperosis; 1, twins; 1, leucorrhea; 1, scarlet fever.

Two mothers had X-rays during the gestation period and 1 mother (and 1 in question) received medication.

The data included in Table 3 indicate labor and delivery information of the mothers in the experimental and control group (N = 28).

The average length of delivery was 12.8 hours (N = 23). Complications arising from labor are negative in all but 4 mothers. One mother had a ruptured membrane; 1 had a rupture of the membrane-transverse; 1 had a pelvic arrest; 1 fetus had a weak heartbeat. Of the 28 mothers, 20 had drugs administered to them during labor.

Twenty-four mothers had spontaneous labor and 1 mother had labor indiced.

Fourteen mothers had their BOW[1] ruptured spontaneously; 9 had their BOW artificially broken; 1 mother had a premature rupture.

The paranatal and the blood data contained in Table 4 are also negative when taken as a group.

Seven mothers were delivered by spontaneous control; 6 had outlet forcepts used; 7 had low forceps used by the doctor; 4 had a Caeserian section; 1 a Kieland rotation; 1 a Scanzoni rotation; 1 a single footling extraction; 1 delivery was reported as "normal." The percentage regarding Caeserian deliveries when compared to the group of mothers used in the Pasamanick,

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[1] Bag of water.

TABLE 3

LABOR AND DELIVERY DATA REGARDING MOTHERS OF CHILDREN IN THE EXPERIMENTAL AND CONTROL GROUPS

(N = 28)

Subject	Length of Labor	Complications of Labor	Treatment		Labor	BOW^c Rupture	
			During Labor (Including Analgesia)	Time Prior to Delivery	S^a or I^b	S^a or A^d	Time Prior to Delivery
C-2-2	6 hours 10 minutes	ō			S	S	20 hours
E-1-1	6 hours 44 minutes	c̄ ō	Seconal (250 mgs.) Demerol (100 mgs.) Nembutal(I.V.) (250 mgs.)	2 hours 9 minutes 30 minutes	S	S	6 hours 44 minutes
E-1-8	60 hours	ō	Seconal (250 mgs.) Demerol (100 mgs.)	1 hour 43 minutes	S	S	60 hours
E-1-4	12 hours	ō	Hykinone (4.8 mgs.I.M.) Seconal (100 mgs.) Demerol (100 mgs.) Nembutal (250 mgs.I.V.)	3 hours 5 minutes 3 hours 10 minutes 1 hour 15 minutes	S	S	20 minutes
C-1-6	2 hours 35 minutes	ō	Demerol Scopolomine		S		
C-2-3					S	S 4:15 PM	29 minutes

TABLE 3--Continued

Subject	Length of Labor	Complications of Labor	Treatment		Labor	BOW^{c} Rupture	
			During Labor (Including Analgesia)	Time Prior to Delivery	S^{a} or I^{b}	S^{a} or A^{d}	Time Prior to Delivery
E-2-10	2 hours 25 minutes		Nembutal (250 mgs.I.V.)		S	S 10:15 PM	
E-1-3							
C-1-9	2 hours 30 minutes	premature rupture of membrane transverse (back up) cephalo pelvic disprop. cervix long and closed	Demerol (100 mgs.) Seconal (250 mgs.)		S	S	Premature
E-2-6	4 hours 35 minutes	ō	Seconal (300 mgs.) Demerol (100 mgs.) Seconal (250 mgs.)	2 hours 30 minutes 2 hours 30 minutes 1	S		
C-2-1	14 hours 5 minutes		Morphine (10 mgs.) Seconal (300 mgs.) Demerol Seconal (100 mgs.) Demerol (50 mgs.) Demerol (50 mgs.) Nembutal (250 mgs.)	17 hours 55 minutes 13 hours 5 minutes 8 hours 30 minutes 6 hours 10 minutes 4 hours 30 minutes	S	A	6 hours 15 minutes

TABLE 3--Continued

Subject	Length of Labor	Complications of Labor	Treatment		Labor	BOW^c Rupture	
			During Labor (Including Analgesia)	Time Prior to Delivery	S^a or I^b	S^a or A^d	Time Prior to Delivery
C-2-4	12 hours 55 minutes	ō	Nembutal (100 mgs.) Demerol (100 mgs.) Demerol (100 mgs.) Luminal (250 mgs.)	7 hours 10 minutes 2 hours 20 minutes 1 hour 40 minutes	S	S	
C-1-2	8 hours 23 minutes				S	S	13 hours 23 minutes
E-2-7	2 hours 30 minutes	ō	Devanal (5.0 cc.) Pitocin (0.5 cc.)		I	A	2 hours 30 minutes
E-2-2	5 hours 56 minutes	ō			S	A	11 minutes
C-2-6	-	-	-	-	-	A	At the time of delivery
E-2-1		ō	Nembutal (200 mgs.) Demerol (100 mgs.) Demerol (100 mgs.)	4 hours 48 minutes 4 hours 48 minutes 1 hour 13 minutes	S	A	48 minutes
C-2-8	2 hours 47 minutes	ō	ō		S	S	47 minutes

TABLE 3--Continued

Subject	Length of Labor	Complications of Labor	Treatment		Labor	BOW^c Rupture	
			During Labor (Including Analgesia)	Time Prior to Delivery	S^a or I^b	S^a or A^d	Time Prior to Delivery
E-2-8	5 hours 20 minutes	ō	Morphine sulphate (8 mgs.)		S		
C-1-4	4 hours 34 minutes	ō	Atropine paraldehyde		S	A	4 hours 34 minutes
C-1-5	37 hours 54 minutes		Morphine sulphate (15 mgs.) Seconal (200 mgs.) Seconal (200 mgs.)	1 hour 29 minutes	S	A	
C-1-7	17 hours	premature rupture of membrane	Demerol (200 mgs.) Seconal (350 mgs.)			premature rupture of membrane	
C-1-1	57 hours 30 minutes	pelvic arrest	Seconal (100 mgs.) Demerol (100 mgs.) Seconal (275 mgs.) I.V. .05 g/w^e Morphine (15 mgs.) Hykinone (4.8 mgs.) Duracillin Morphine (15 mgs.) I.V. protein hydrolysate^f	53 hours 33.5 hours 33.5 hours 21.25 hours 16 hours 16 hours 16 hours 7.5 hours 6.5 hours	S	A	4 hours

TABLE 3--Continued

Subject	Length of Labor	Complications of Labor	Treatment		Labor	BOW[c] Rupture	
			During Labor (Including Analgesia)	Time Prior to Delivery	S[a] or I[b]	S[a] or A[d]	Time Prior to Delivery
E-2-3	8 hours	ō	Demerol (100 mgs.) Nembutal (275 mgs.) Nembutal (275 mgs.)	3 hours 30 minutes	S	S	26 minutes
E-1-5	11 hours 25 minutes	one fetal heart weak	Seconal (300 mgs.) Luminal (120 mgs.) Demerol (100 mgs.) Scopolamine		S	S	7 hours
E-1-9	1 hour 30 minutes	ō	I.V. Nembutal (200 mgs.)		S	S	15 minutes
E-1-6	7 hours 50 minutes	ō	ō		S	S	10 minutes
E-1-2	None Caeserean section breech presentation, question. cephalo-pelvic dispropation large baby-previous history		Nembutal (100 mgs.) Scopolamine		none	A	

[a] Spontaneous.

[b] Induced.

[c] Bag of waters (Amniotic fluid).

[d] Artificial.

[e] I.V. intraveneous 5 percent glucose in water.

[f] Enumeration of treatment completed in last box "neo-natal complications."

TABLE 4

PARANATAL AND BLOOD DATA REGARDING MOTHERS OF CHILDREN IN THE EXPERIMENTAL AND CONTROL GROUPS
(N = 28)

Subject	First Stage	Second Stage	Presentation Position	Method of Delivery	Third Stage	Placenta and Abnormalities Thereof	Anesthesia		Blood Group and Rh	
							Type	Duration	Mother	Infant
C-2-2	4 PM 3/21 6 hours	10 PM 3/24 10 minutes	LOA[a]	outlet forceps	10:10 PM	spontaneous complete	gas			
E-1-1	2:30 AM 5/2 6 hours 20 minutes	8:50 AM 24 minutes	LOA	outlet forceps	9:14 AM	spontaneous complete	gas		A (+)	
E-1-8	11:45 AM 1/4 59 hours 35 minutes	11:20 PM 1/6 22 minutes	LOA	outlet forceps	11:42 PM	spontaneous complete	gas		B (-)	
E-1-4	11:20 PM 6/15 11 hours 50 minutes	11:10 AM 6/16 22 minutes	LOA	outlet forceps	11:32 AM	spontaneous complete	gas		0 (+)	
C-1-6	4:30 AM 2 hours	6:30 AM 35 minutes	ROA[b]	spontaneous controlled	7:05 AM	spontaneous and intact, 1 coil of cord about neck	pudental block		(+)	
C-2-3			ROT[c]	Kielland rotation	4:44 PM	expressed intact	gas O_2 and ether			

TABLE 4--Continued

Subject	First Stage	Second Stage	Presentation Position	Method of Delivery	Third Stage	Placenta and Abnormalities Thereof	Anesthesia		Blood Group and Rh	
							Type	Duration	Mother	Infant
E-2-10	8:30 PM 3/30 1 hour 50 minutes	10:20 PM 30 minutes	LOA	Low forceps	10:50 PM		ethylene and O_2		(+)	
E-1-3				Repeat CS^a. (low cervical ovarian cyst dystocia			spinal and Pentathal			
C-1-9	9 AM 4/26 2 hours 25 minutes	11:25 AM	transverse (back up)	CS		cord around baby's neck	Pentathal ether and O_2		(+)	(+)
E-2-6	4 AM 10/26 4 hours 32 minutes	8:32 AM 3 minutes	LOA	spontaneous	8:35 AM	ō	ethylene and O_2	34 minutes	A (+)	
C-2-1	3 PM 6/25 14 hours 2 minutes	5:02 AM 6/26 3 minutes	LOP^e low mid rotation	LOA forceps	5:05 AM	spontaneous and intact 2 loops about neck	ether ethylene O_2	1	B (+)	
C-2-4	12 M 2/17 12 hours 55 minutes	12:55 PM 2/17 5 minutes	LOA	spontaneous	1 PM	intact	ether and O_2	30 minutes		

TABLE 4--Continued

Subject	First Stage	Second Stage	Presentation Position	Method of Delivery	Third Stage	Placenta and Abnormalities Thereof	Anesthesia		Blood Group and Rh	
							Type	Duration	Mother	Infant
C-1-2	10 AM 9/17 8 hours 13 minutes	6:23 PM 2 minutes	LOA	spontaneous	6:25 PM	intact	gas ether and O_2			
E-2-7			ROA	spontaneous		intact	Devanal 6.0 cc		(+)	
E-2-2	1 AM 4/21 5 hours 56 minutes	6:56 AM 4 minutes	OA	spontaneous	7 AM	intact	ether and O_2			
C-2-6	-	-		CS cephalo pelvic dispropation 1 month past due date		none	gas-ether	45 minutes		
E-2-1		18 minutes	vertex LOA	outlet forceps	7 minutes	none	ethylene and O_2	30 minutes		
C-2-8	5 AM 7/12 2 hours 47 minutes	2 minutes	vertex LOA	spontaneous delivery	5 minutes	none	ethylene and O_2			

TABLE 4--Continued

Subject	First Stage	Second Stage	Presentation Position	Method of Delivery	Third Stage	Placenta and Abnormalities Thereof	Anesthesia		Blood Group and Rh	
							Type	Duration	Mother	Infant
E-2-8	5 hours 20 minutes		vertex LOA		10 minutes	none	ethylene and O_2		A (+)	
C-1-4	11:30 AM 7/12	4 PM 7/12	vertex ROA	outlet forceps	3 minutes	none	ether and O_2			
C-1-5	10 AM 2/12	11:54 PM 2/13		low forceps	12 PM 6 minutes	none	pentothal ethylene O_2	25 minutes	(+)	
C-1-7	15 hours	2 hours	vertex ROA	low forceps		none	ethylene not well tolerated		O (+)	
C-1-1	6 AM 2/6 57 hours	3:30 PM 2/8 23 minutes	LOP	low mid forceps with Scanzoni rotation		ō	spinal	43 minutes	A (+)	
E-2-3	8:50 PM 7/19 7 hours 45 minutes	4:35 AM 7/20 11 minutes	ROP[f]	low outlet forceps	2 minutes	ō	gas		B (+)	
E-1-5	9:30 PM 3/16	8 AM 3/17	LOA (still birth) LSA[g]	single footling extraction	5 minutes	ō	ethylene ether O_2	30 minutes		

TABLE 4--Continued

Subject	First Stage	Second Stage	Presentation Position	Method of Delivery	Third Stage	Placenta and Abnormalities Thereof	Anesthesia		Blood Group and Rh	
							Type	Duration	Mother	Infant
E-1-9	5 AM 11/1	6 AM 11/1	LOA	outlet forceps	15 minutes	ō	ether and O_2	30 minutes	(+)	
E-1-6	12 AM	7:30 PM	LOP	normal spontaneous delivery	3 minutes	multiple infarcts with hemorrhage into placental tissue	caudal ethylene O_2			
E-1-2			RSP	low cervical CS		ō	ether and O_2	1 hour		

[a] LOA = occipital left anterior.
[b] ROA = occipital right anterior.
[c] ROT =
[d] CS = caeserian section.
[e] LOP = occipital left posterior.
[f] ROP = occipital right posterior.
[g] LSA = sacrum left anterior.
[h] RSP = sacrum right posterior.

Rogers, and Lilienfield (3) study is considerably larger. Caution must be noted in that their study had a total N of 830 (white and non-whites).

The condition of the placenta was reported in 26 mothers (N = 28). Two babies had the cord wrapped around their necks once; 1 had the cord wrapped around twice; and 1 placenta exhibited multiple infarcts with hemorrhage. The majority of mothers showed a spontaneous and intact placenta.

All mothers had gas or spinal blocks given to aid delivery.

Only one infant's blood group was reported and that was the same as the mothers.

The postnatal factors as related to the birth of the children (N = 28) are negative. Fifteen mothers were reported as having an episiotomy as part of the process of delivery; 3 mothers had a Caeserian section; (one mother who was reported in Table 4 as having a Caeserian section, was not reported in this table as to the delivery procedure used); 1 mother was reported as having a first degree laceration as part of the operative procedure. Post-partum complications were negative except for moderate bleeding in 2 mothers; 1 mother was depressed; a 1 degree laceration reported for one mother (see Table 5).

Birth weight ranged from 3.2 pounds to 9.1 pounds. Four babies were under 5 pounds and may be considered premature. Infant length ranged from 16 inches to 23 inches.

Respiration data are generally negative. Respiration time was reported for 11 infants. The time ranged from

TABLE 5

POSTNATAL FACTORS RELATED TO BIRTH OF CHILDREN (N = 28)

Sub-ject	Operative Procedures	Post Partum Complica-tions	Infant		Respiration Established			Resuscitation	Cry
			Weight (Pounds-Ounces)	Length (Inches)	Sa	A^b	Time		
C-2-2	episiotomy	$\bar{o}$	5- 3	19					
E-1-1	episiotomy	$\bar{o}$	7	20.75					
E-1-8	episiotomy		4- 4	17	yes-no sluggish did not breathe readily	yes		yes O_2	weak
C-1-4			6- 5	19.5					
C-1-6	episiotomy	$\bar{o}$	7-.75	22.5					normal
C-2-3									
E-2-10			5-13	19	yes				
E-1-3	caesarian section low cervical		8-10		yes dusky in color				vigorous

TABLE 5--Continued

Sub-ject	Operative Procedures	Post Partum Complica-tions	Infant		Respiration Established			Resuscitation	Cry
			Weight (Pounds-Ounces)	Length (Inches)	S[a]	A[b]	Time		
C-1-9	caesarian section	ō	8-13	22	yes				sponta-neous and good
E-2-6	episiotomy	moderate bleeding given 500 cc of whole blood	8- 3	23		yes	2 minutes	suction and O_2 4-5 minutes	
C-2-1	episiotomy	ō	6- 3.5	19		yes	2 minutes	suction and O_2 4 minutes	
C-2-4			6- 7	19.5	yes			suction and O_2	
C-1-2		1st degree laceration	7-11.5	21					
E-2-7		ō	5- 6	20		yes	5-6 minutes	suction artificial respiration O_2 coramine	weak and "obsti-nate
E-2-2	episiotomy	ō	4-10	16	yes				

TABLE 5--Continued

Sub-ject	Operative Procedures	Post Partum Complica-tions	Infant		Respiration Established			Resuscitation	Cry
			Weight (Pounds-Ounces)	Length (Inches)	S[a]	A[b]	Time		
C-2-6	caesarian section	$\bar{o}$	8- 5	20.5	yes		immedi-ately	subsequent to spontaneous cry, good color, breathing less active than normal-stimulation and suction-normal breathing and good color	good
E-2-1	eipsiotomy	$\bar{o}$	7- 1	20.5	yes			$\bar{o}$	good
C-2-8	1st degree laceration	$\bar{o}$	9	22				resuscitated and suctioned	good
E-2-8	episiotomy	"blues"	7-9.75	21				routine	
C-1-4			6- 2	19					
C-1-5	episiotomy	$\bar{o}$	6-10	20		yes	2 minutes		good
C-1-7	episiotomy	moderate blood loss; foul smelling amniotic fluid	7-12			yes	20 seconds	yes O_2	O.K.

TABLE 5--Continued

Subject	Operative Procedures	Post Partum Complications	Infant		Respiration Established			Resuscitation	Cry
			Weight (Pounds-Ounces)	Length (Inches)	S[a]	A[b]	Time		
C-1-1	episiotomy and Scanzoni rotation	ō	6-11	20.5					
E-2-3			8- 2	23	yes		20 minutes	aspirateur and given O_2	
E-1-5	episiotomy		4-12				3 minutes	positive pressured O_2 and suctional	weak
C-1-9	episiotomy		6-14	20	yes		at birth	O_2	lusty
E-1-6	episiotomy		3- 2		yes		1 minute	continuous O_2 and suction	yes
E-1-2			8-13	21			1 minute	ō	lusty

[a] Respiration established spontaneously.

[b] Respiration established artificially.

immediately to 5 to 6 minutes. Four infants had respiration established after 1 minute.

Additional postnatal factors as reported in Table 6 show generally negative information. In the column Birth Injury, only one report was noted. This was a bruise caused by forceps on the right side of one infant's face. Only two anomalies were reported and both concerned the infant's testicles. One was quite small and one infant was reported as having a testicle that was undescended.

The neonatal complication column reveals the following: 6 infants were jaundiced; 1 had the possibility of a subdural hematoma; 1 had forcep injuries; 1 exhibited a bilateral talipes equina varus; 1 might have had an intracranial hemorrhage.

Seven mothers reported feeding their babies by the breast, 6 by formula, and 1 by both methods.

Electroencephalographic Study

In clinical medicine and in clinical psychology, after a syndrome has been described, clinicians frequently seek to find a laboratory procedure which in itself is not too complicated and which, therefore, can be used as a confirmation of the clinical diagnosis. Whatever term is used as a label for children with behavior and learning disabilities (organic brain damage, hyperactive, physiologic maturational lag, etc.), the implication seems to be that the difficulty must be in the central nervous system. Teachers, psychologists, and physicians, after describing a clinical picture, therefore

TABLE 6

ADDITIONAL POSTNATAL FACTORS IN THE CHILDREN
(N = 28)

Subject	Condition at Birth	Caput	Molding	Anomalies	Birth Injury	Feeding	Neo-natal Complications
C-2-2						breast	sluggish-jaundiced 3/26/49
E-1-1						formula	ō
E-1-8						formula	prematurity; irregular respiration with apnea; moderately cyanotic diagnosis: atelectasis 1/10/48-seems jaundiced; no definite area of atelectasis fontanelle full; subdural hematoma may be considered; diagnosis: "central" respiratory impairment; 1/11/48--O_2 no longer necessary
C-1-4						formula	6/18-seems to be cyanotic-improved with O_2-given penicillin; diagnosis: interstitial atelectasis; 6/19-penicillin; 6/20-O_2 discontinued; jaundice-penicillin; 6/21-out of O_2-penicillin
C-1-6	good		cephalo hematoma left occiput	left testicle quite small			
C-2-3							

TABLE 6--Continued

Subject	Condition at Birth	Caput	Molding	Anomalies	Birth Injury	Feeding	Neo-natal Complications
E-2-10							admitted to hospital 3/22/49-37th week of gestation-pre eclampsia, mild (edema and hypertension 142/100)-salt free diet 3/22: Nembutal 100 mgs. 4PM, Demerol 100 mgs. 6:30 PM, Nembutal 100 mgs. 9:30 PM; 3/23: Nembutal 100 mgs. 7:30 AM, Nembutal 100 mgs. 7 PM, Nembutal 100 mgs. 8 PM; 3/24: Nembutal 100 mgs. 10 AM, Nembutal 100 mgs. 7 PM, Nembutal 100 mgs. 9 PM
E-1-3							
C-1-9	cyanotic						
E-2-6	dusky color						general condition good
C-2-1	dusky					breast formula	draining parietal,forceps injuries
C-2-4	"baby jittery" skin dry and peeling			right testicle undescended		breast	normal spontaneous delivery of male infant; amniotic fluid deeply colored with meconium; infant of poor color-very dirty
C-1-2	good						
E-2-7	"fair"						baby failed to breathe spontaneously-born with cord around neck, was not tight; no cyanosis-heart good-no voluntary, spontaneous breathing. Suctioned; Coramine-O_2. "After rather vigorous resuscitation, began to breathe-5-6 minutes later. X-ray of chest-right lung atelectasis.

TABLE 6--Continued

Subject	Condition at Birth	Caput	Molding	Anomalies	Birth Injury	Feeding	Neo-natal Complications
E-2-2	good						bilateral talipes equinovarus; placed in incubator and O_2-received hypodermoclysis; regained birth weight-8th day
C-2-6	good	ō	ō	ō	ō	formula	jaundiced 4th day; discharged on 22nd of July
E-2-1	good					breast	circumcision
C-2-8	good					formula	
E-2-8	good					breast	
C-1-4	satis-factory						
C-1-5	dusky color muscle tone O.K.					breast	slightly jaundiced on 3rd day
C-1-7	O.K. amnionitis					breast	
C-1-1							slightly jaundiced and dehydrated 3rd day-given clysis 75cc 2.5 percent G.W. 4th and 5th days; Hgh-18 mgs.; RBC-5.86; WBC-8.6; circumcised 8th day. Continuation of "Treatment during labor" Duracillin, Pitocin 0.03cc 4 hours; Pitocin 0.06cc 3.5 hours; Nembutal 4cc CU 2 hours; Pitocin 0.06 cc 20 minutes.

TABLE 6--Continued

Subject	Condition at Birth	Caput	Molding	Anomalies	Birth Injury	Feeding	Neo-natal Complications
E-2-3					bruise of forceps--marks on right side of face		ō
E-1-5						formula	placed in incubator with O_2; weak cry: color good except for hands and feet which were cyanotic and edamatous 3/21-extremely jittery-shrill cry-(? intracranial hemorrhage) given phenobarbital; discontinued 3/28--discharged 3/29
C-1-9	good	slight	slight	ō	ō		
E-1-6	fair	ō	ō	ō			continuous O_2-cyanotic, out of O_2 1/8/50; discharged 1/26/50; 23 days old weight = 4 pounds 7.5 ounces
E-1-2	good	ō	ō	ō	ō	breast	

frequently turn to the neurologist for his evaluation and hopefully look to the electroencephalograph for further help. This procedure was also followed in the present pilot study and an opportunity was presented to try to correlate the EEG findings with the clinical observations.

All of the 40 subjects were administered at least one EEG during the diagnostic period. Although 22 of the 40 EEG recordings showed abnormal electrical activity, what was considered to be of greater significance insofar as this particular study was concerned, was the fact that an extraordinarily high percentage of the recordings demonstrated a persistent occipital slow wave.[1] There were provided to the authors by Dr. Robert Cohn, self-administered and interpreted electroencephalograms and neurological examinations of the research project selectees (in addition to those performed by the staff neurological diagnostician). His interpretation of the significance of this particular finding in these 40 children, plus a control group of 130 children, is summarized below:

> In EEG recordings from children it has become common practice to accept non-paroxysmal occipital slow activity as a normal phenomenon. A randomly selected normal control series of 130 children ranging in age from 6 to 12 years (selected from the same public school population as the children of the pilot study), showed 22 subjects (17 per cent) with slow waves in each occipital

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[1] In terms of this particular finding, it is important to note that Dr. Robert Cohn of the United States Naval Hospital, Bethesda, Maryland, although not a member of the diagnostic staff of the research project, cooperated with the staff insofar as the project met his research interests in determining the possible relationship of the bi-occipital slow waves to behavior and learning difficulties. Dr. Frederick Ratzeburg, staff clinical psychologist, cooperated with Dr. Cohn in the administration of psychological tests to the same children.

> derivation, sometimes synchronous, but more often of greater prominence on one side. This slow activity consisted of variable length sequences of 180 to 250 millisecond waves. In a series of 47 individuals (including all of the above mentioned 40 children), ranging in age from 6 to 11 years, who showed clinical disturbances in reading, writing, and adaptive behavior, bioccipital slow waves were observed in 29 cases (62 per cent). Sometimes this occipital slow output was coterminus with indisputable paroxysmal discharges. From this data it is concluded that occipital slow activity cannot categorically be considered as a benign phenomenon in children. By means of a frequency correlation of age versus occipital slow activity, and from clinical neurological data, there is good evidence that persistent occipital slow waves are representative of retarded physiological maturation processes of the brain.[1]

As a part of the diagnostic phase, then, group findings were obtained with respect to the EEG which have important implications in understanding the children of the pilot study. As a result of the EEG findings, the authors and their associates were further convinced that children's progress must be adjusted to individual growth patterns if behavior problems and educational retardation were not to be even more pronounced than already viewed in the case summaries. While the EEG did not demonstrate abnormal brain wave patterns in each child, nevertheless a statistically significant difference (p = .001) obtains between the control group of Cohn and the subjects of the present pilot study for the occipital slow waves, which warrants further investigation of this problem by others in the future.

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[1] Abstract from a paper titled "On the Significance of Bioccipital Slow Wave Activity in the Electroencephalograms of Children" presented by Dr. Robert Cohn at the American Electroencephalographic Society Annual Meeting, June, 1958.

Study Group Organized

As a result of the procedures which have been delineated above, 40 children were selected. The diagnostic team temporarily concluded its work waiting the outcome of matching the children into four relatively equated groups on the basis of the factors which have been indicated. Some additional children ultimately had to be examined in order to obtain equated groups of the desired number. However, once the diagnostic phase of the project had been completed and the second phase of the project, grouping, had been initiated, the appointments of the diagnostic staff members (with the exception of the pediatrician, psychiatrist, and psychologist) were officially terminated. The pediatrician and psychiatrist were retained on a continuation basis for the duration of the project. The pediatrician acted as the school physician to the children participating in the research classes and the psychiatrist acted on a consultant basis to the research teachers and provided a psychiatric re-evaluation of the children's progress prior to the termination of the project. The research clinical psychologist's duties for the duration of the study have been delineated previously.

Footnote References

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CHAPTER IV

MATCHING CRITERIA, GROUPING PROCEDURES, AND TEACHER SELECTION

The academic phase of the project was to investigate within the framework of classroom situations, the reliability, effectiveness, and instructional usefulness of a specialized teaching methodology. This included a stimulus-free classroom environment, a highly structured teaching program, and specially designed teaching equipment and materials.

This phase was divided into four separate but overlapping steps. First, the 40 research project selectees were matched and grouped in line with the research design criteria into four separate groups, two experimental and two control. Second, the four research teachers and the teacher aides were selected and trained in the preparation and use of the instructional materials and programming of the specialized teaching methodology, and the two experimental classrooms were reconditioned. Third, the specialized teaching methodology was experimentally used in classroom situations during the academic year 1957-58. Fourth, the total group was retested by the clinical psychologist and re-evaluated by the psychiatrist in order to assess the effect of the diagnostic grouping, specialized teaching methodology, and classroom environment on the learning problems and behavior response patterns of the children. This chapter covers the first two of these steps.

The primary purpose of this chapter is to report material which defines, in detail, the composition of the four groups of children in terms of the criteria of the research design, and to explain the basis for the selection of the four teachers. Some of the most thought-provoking problems raised by the study are in connection with the results of the grouping criteriautilized in matching the four classes and the educational implications in relation to matching the teachers to their groups. The nature and significance of these problems are explored in Chapter VII.

The specific nature of the techniques, methods and instructional programming are not the province of this chapter. However, the reconditioning of classrooms to provide a non-stimulating environment is described in detail, both as it distinguished the experimental from the control groups and as it directly related to classroom management in the experimental groups.

Matching Criteria

Before designating which two groups were experimental, all four groups were matched in terms of the following research criteria and instructional factors: chronological age, mental age, intelligence quotient, Stanford-Binet mental age range, instructional or achievement levels from previous school experience, perseveration, hyperactivity, ratio of students with no previous experience in special education classes, and number of children demonstrating diagnostic evidence of specific damage to the central nervous system. Tables 7 and 8 indicate the extent of the matching on the first four of the above factors.

The specific matching criteria are noted in Table 7. No statistically significant differences exist on any of the items in the table. The groups ranged in average chronological age from 7-11 years to 8-2 years; in average mental age, from 6-2 years to 6-9 years. In intelligence quotient the four groups ranged from an average of 78 through 82.2 with an average mental age range on the Terman-Merrill Revision of the Stanford-Binet Scale of from 5.1 years to 5.4 years.

The range for the individual groups on the four matching criteria is noted in Table 8. Some comment needs to be made regarding the intelligence quotient range. The range in Experimental Group I, for example, is from intelligence quotient 51 through 102. This violates grouping by intelligence as this is ordinarily conceived in the field of special education. A decision to permit this unusual range was made 1) because of the small groups of children which were involved, 2) because of the highly individualized nature of the work which was to be done, and 3) because of the fact that the reliability of the initial intelligence quotients was questioned by the staff psychologist and others related to the study. The latter was due to the fact that the same factors which resulted in poor achievement in school learning tasks would operate to depress the intelligence quotient scores also. While the range is recognized to be great and normally would not be recommended, it did not act as a deterrent to satisfactory function of the classes in this particular study.

TABLE 7

MATCHING CRITERIA FOR THE FOUR GROUPS

Group	Average CA	Average MA	Average IQ	Stanford-Binet MA Range
Experimental I	8- 0	6-2	78.0	5.4
Experimental II	7-11	6-6	81.0	5.1
Control I	8- 2	6-9	80.2	5.3
Control II	8- 2	6-8	82.2	5.3

TABLE 8

RANGE IN MATCHING CRITERIA FOR THE FOUR GROUPS

Group	CA (Inclusive)		MA (Inclusive)		IQ (Inclusive)		Stanford-Binet MA Range (Inclusive) (Years)
Experimental I	6-10	9-2	4-8	7-10	51	102	5 through 7
Experimental II	6- 9	9-9	5-2	8-10	62	107	2 through 7
Control I	6-10	9-5	5-0	8- 4	61	102	3 through 8
Control II	6-11	9-7	5-5	8-10	68	107	2 through 7

Grouping Procedures

Tables 9, 10, 11, and 12 illustrate the readiness characteristics of the children in each of the four groups as measured by the Metropolitan Readiness Test in November, 1957, after the matching had been completed. Care had been taken to ascertain that no more than three instructional groups were assigned to each teacher, i.e., pre-academic, primary,

TABLE 9
METROPOLITAN READINESS TEST
November, 1957
Group Experimental I (E-1)

Sub-ject	Word Meaning	Sen-tences	Infor-mation	Match-ing	Total 1-4	Numbers	Copy-ing	Total 1-6	Readiness			Percentile Rank
									Reading	Number	Total	
E-1-4	18	12	13	15	58	15	5	78	B[b]	C[c]	C	68
E-1-3	17	11	11	18	57	17	10	84	B	B	B	84
E-1-1	16	9	12	11	48	15	2	65	C	C	C	37
E-1-9	17	10	11	15	53	19	6	78	C	B	C	68
E-1-7	16	13	11	0	40	11	4	55	D[d]	C	D	19
E-1-5	18	12	13	12	55	14	7	76	B	C	C	63
E-1-8	19	14	13	17	63	20	8	91	A[a]	B	A	96
E-1-10	13	5	12	11	41	8	1	50	D	D	D	13
E-1-2	18	14	14	16	62	24	5	91	A	A	A	96
E-1-6	16	6	9	9	40	10	3	53	D	C	D	17

[a] A = Superior
[b] B = High Normal
[c] C = Average
[d] D = Low Average

SUMMARY OF GROUP INSTRUCTIONAL LEVELS

		Number of Children
1.	First half of kindergarten	4
2.	First half of first grade	3
3.	Second half of first grade	3

TABLE 10

METROPOLITAN READINESS TEST
November, 1957
Group Experimental II (E-2)

Subject	Word Meaning	Sentences	Information	Matching	Total 1-4	Numbers	Copying	Total 1-6	Readiness			Percentile Rank
									Reading	Number	Total	
E-2-5	18	8	13	14	53	14	4	71	C[c]	C	C	51
E-2-3	15	8	9	14	46	20	4	70	D[d]	B[b]	C	48
E-2-9	18	11	12	15	56	20	4	80	B	B	B	73
E-2-7	14	8	11	10	43	15	1	59	D	C	D	25
E-2-4	18	11	14	18	61	23	10	94	A[a]	A	A	99
E-2-2	18	13	14	18	63	24	7	94	A	A	A	99
E-2-1	19	13	13	16	61	23	8	92	A	A	A	97
E-2-6	15	7	11	11	44	16	6	66	D	B	C	39
E-2-8	19	5	11	9	44	7	1	52	D	D	D	15
E-2-10	17	14	14	16	61	17	4	82	A	B	B	79

[a] A = Superior

[b] B = High Normal

[c] C = Average

[d] D = Low Average

SUMMARY OF GROUP INSTRUCTIONAL LEVELS

	Number of Children
1. Second half of kindergarten	4
2. First half of first grade	3
3. Second half of first grade	3

TABLE 11

METROPOLITAN READINESS TEST
November, 1957
Group Control I (C-1)

Subject	Word Meaning	Sentences	Information	Matching	Total 1-4	Numbers	Copying	Total 1-6	Readiness			Percentile Rank
									Reading	Number	Total	
C-1-5	16	12	14	16	58	19	10	87	B[b]	B	B	90
C-1-4	14	7	12	13	46	6	3	55	D[d]	D	D	19
C-1-3	18	12	13	18	61	24	10	95	A[a]	A	A	99
C-1-8	18	13	14	13	58	18	6	82	B	B	B	79
C-1-6	18	11	13	15	57	13	1	71	B	C[c]	C	51
C-1-7	17	7	12	12	48	12	4	64	C	C	D	35
C-1-1	18	13	14	16	61	24	9	94	A	A	A	99
C-1-10	16	9	10	11	46	7	1	54	D	D	D	18
C-1-9	14	8	12	13	47	20	8	75	C	B	C	61
C-1-2	18	13	14	18	63	23	10	96	A	A	A	99

[a] A = Superior
[b] B = High Normal
[c] C = Average
[d] D = Low Normal

SUMMARY OF GROUP INSTRUCTIONAL LEVELS

	Number of Children
1. First half of first grade	3
2. First half of second grade	5
3. Second half of third grade	2

TABLE 12

METROPOLITAN READINESS TEST
November, 1957
Group Control II (C-2)

Subject	Word Meaning	Sentences	Information	Matching	Total 1-4	Numbers	Copying	Total 1-6	Readiness			Percentile Rank
									Reading	Number	Total	
C-2-7	18	9	14	13	54	15	6	75	C[c]	C	C	61
C-2-1	18	13	14	18	63	24	10	97	A[a]	A	A	99
C-2-10	17	10	12	15	54	21	8	83	C	A	B[b]	81
C-2-5	17	9	13	16	55	14	6	75	C	C	C	61
C-2-6	17	10	12	10	49	11	6	66	C	C	C	39
C-2-2	18	14	14	18	64	23	9	96	A	A	A	99
C-2-9	16	11	13	8	48	10	2	60	C	C	D[d]	27
C-2-4	19	13	13	18	63	20	10	93	A	B	A	98
C-2-3	18	12	14	16	60	20	6	86	B	B	B	88
C-2-8	17	10	9	10	46	15	4	65	D	C	C	37

[a] A = Superior
[b] B = High Normal
[c] C = Average
[d] D = Low Average

SUMMARY OF GROUP INSTRUCTIONAL LEVELS

	Number of Children
1. First half of kindergarten	3
2. First half of first grade	3
3. First half of second grade	4

elementary, etc. The grouping was necessarily based arbitrarily through the use of the traditional criteria of CA (chronological age), MA (mental age), IQ, and achievement level.

The other factors considered in grouping the children are discussed in the following paragraphs:

1. Perseveration. Although perseveration was a learning difficulty characteristic of the total group, no more than 4 children were assigned to any group whose perseverative tendencies, as informally evaluated from teachers' records, constituted the primary learning handicap and instructional problem to the teacher.

2. Hyperactivity. An attempt was made in matching the children to balance the four groups in terms of placing in each group approximately 5 children whose hyperactive response pattern appeared, at least superficially, to be a response to environmental stimuli and unstructured group situations. This type of hyperactive behavior is in contrast to that which has a persistent drive quality and appears to be more internalized and less subject to environmental and group modification.

3. Previous Special Education Class Placement. The administrative staff responsible for grouping the children had long felt that children with specific learning problems and behavior disorders made greater progress after their initial adjustment in a special education class than in any year thereafter. On the basis of this experience, 5 children were assigned to each group who had had no previous special education experience.

4. Diagnostic Evidence of Injury to the Central Nervous System. Matching the groups with reference to this particular criterion of the research design was medically and neurologically complicated. Moreover, the entire group, regardless of the clinical picture, demonstrated in varying degrees, learning and behavior characteristics customarily associated with injury to the central nervous system. The research design required that at least 20 of the 40 children demonstrate not only clinical evidence of these types of learning problems, but that they appear in association with medical and neurological evidence of central nervous system damage without gross motor involvement.

Working within limitations, however, it was still possible to use gross evidence of organic pathology as one of the guides to class assignment. For example, no more than 5 children for whom the complete diagnostic evaluation demonstrated gross evidence of damage to the central nervous system were assigned to any group. One of these children demonstrated no abnormality in the EEG tracing, while 2 of the children with no other medical or neurological evidence of central nervous system damage did demonstrate grossly abnormal EEG's.

Transportation

Once the task of matching the children was completed, the proposed class lists were turned over to the special education transportation secretary who spent endless hours reorganizing her entire transportation schedule in an effort to meet the transportation needs of the project children and at the same time maintain the proposed class lists intact. As a result of this single factor, it was necessary to reassign only 4 children, 2 out of the 4 by simply reversing the school assignment of matched pairs. The end result was that not only were the four groups matched in terms of the research design criteria, but each individual child (with the exception of 2) matched one other child in each of the other three groups.

There was no statistically significant difference among the four groups at the pre-test period so far as these grouping and matching criteria are concerned.

The Teaching Situations

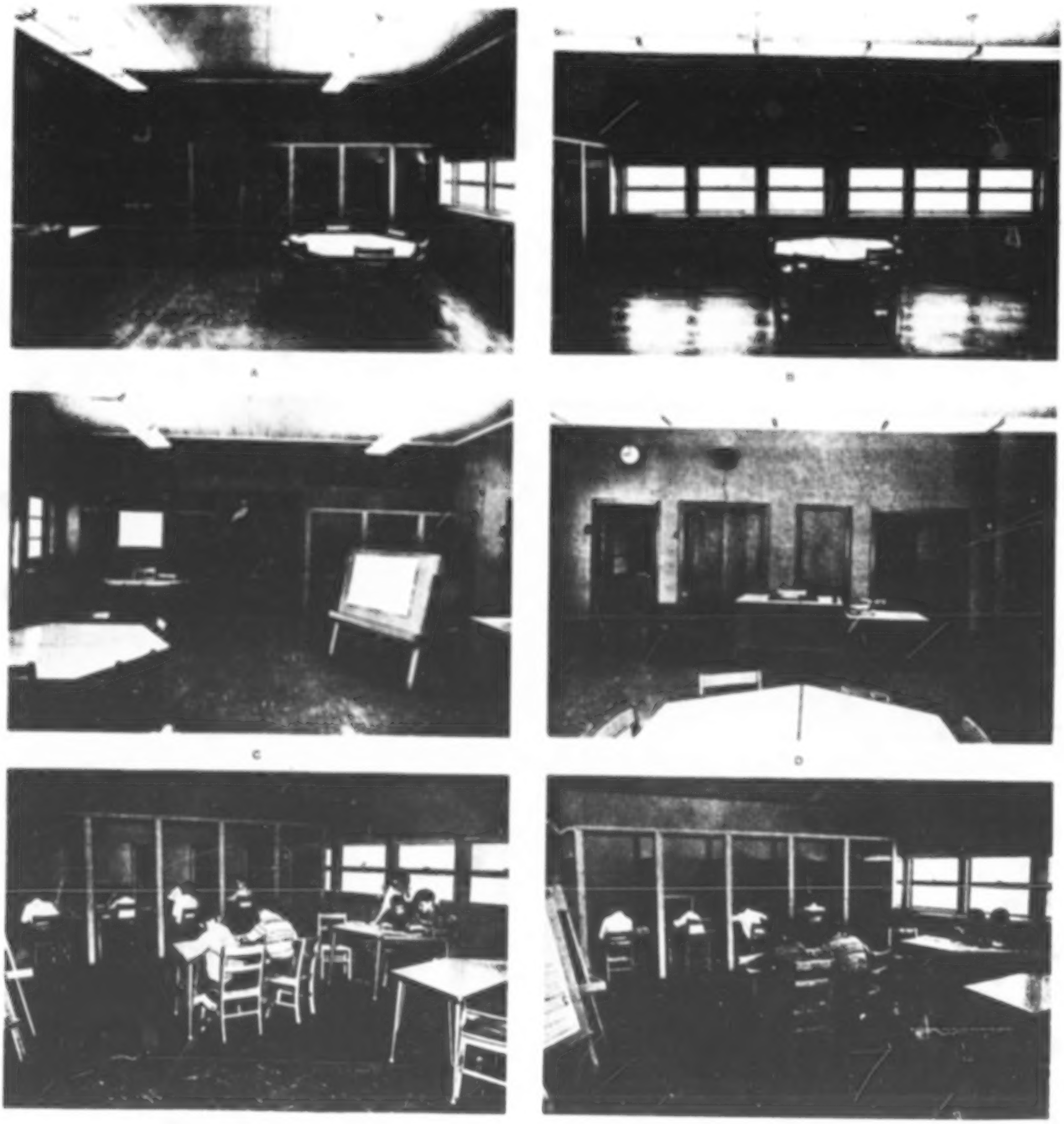
Once the task of matching the four groups in terms of the above criteria was completed, two groups of 10 children each were designated as Experimental and 2 as Control.

The difference between the Experimental and Control groups consisted of two factors. First, strict adherence by the experimental teachers to the prescribed use of the specialized teaching methodology and, second, the use of the non-stimulating classroom environment in the experimental groups. The latter will be described here.

The two Experimental groups were housed in one elementary school in order to facilitate the renovation of the two classrooms and provide for maximum instructional assistance on the part of the teacher aide to the two experimental teachers. The two Control groups were assigned to two separate schools where classroom space was available and where the school administrators were receptive to the research program. No modifications were initiated in these two classrooms other than those which are customarily employed by special education teachers, such as the temporary use of screens with highly distractible children.

In line with the recommendations of Cruickshank and Dolphin and Strauss and Lehtinen, the two experimental rooms were painted a uniform color closely matching the honey colored woodwork. Individual work cubicles with built-in desk tops were designed and built to the height and weight measurements of the individual children in each group (Figures 2-a, 2-c, 3-a, 3-c). Open coat closets and supply cabinets were provided with sliding doors (Figures 2-d, 3-d). Windows were made opaque with a plastic medium which did not exclude light but eliminated outside stimuli (Figures 2-b, 3-b). Individual two-shelf lockers equipped with snap-lock doors were built for each child (Figures 2-b, 3-b). These lockers fit snugly below the window ledges and between the heating units, thus, not only providing the children with adequate storage space for their daily work, but also eliminating a number of distracting stimuli in the form of spatial interruptions.

Aside from any other contribution which these lockers made toward establishing a uniformly non-stimulating learning environment, their use became one of the main organizing experiences of the children. Their measurements (30 x 14 x 17 inches) allowed space for two shelves in each locker. On the top shelf the teacher placed the instructional material for each of the daily assignments in the order in which the tasks were to be completed.



A

B

C

D

E

F

Fig. 2.--Photographs of interior of Experimental Classroom 1. Figures 2a, 2b, 2c, and 2d were taken about 5 months after the program started. Furniture in the center of the room has been added since the program started. Small group work illustrated in Figures 2e and 2f indicates progress which some children have made in tolerating larger space and increased stimuli. The latter were taken 5 months after initiation of program.

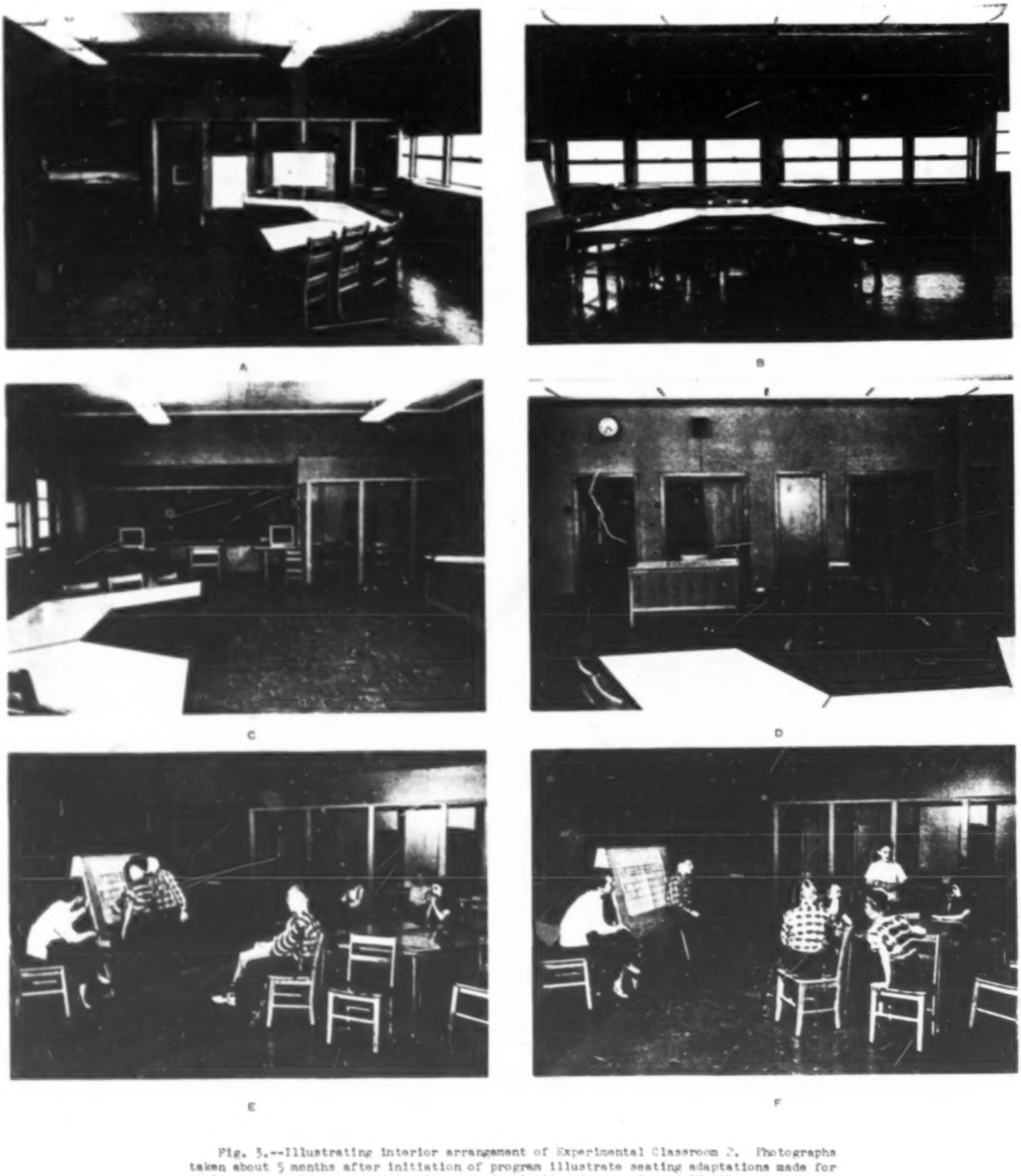


Fig. 3.--Illustrating interior arrangement of Experimental Classroom 2. Photographs taken about 5 months after initiation of program illustrate seating adaptations made for children in various stages of tolerance of stimuli. Figures 3e and 3f illustrate a group reading experience with children seated and working in situations most comfortable to them psychologically.

Each single assignment during the day was checked by the teacher and only when the task was correctly completed was the child allowed to file his work on the bottom shelf. This practice introduced into the classroom learning situation a rigid order of sequential procedures in work organization for both the child and teacher which, by its very nature, developed organized work habits and increased the child's personal sense of responsibility for order and cleanliness.

In addition, the systematization required on the part of the teacher in checking each piece of work as it was finished meant that each child experienced, over and over again each day, success in a series of given tasks before he moved on to the next step in the learning process.

Initially, all individual work assignments were completed in the cubicle of each child. Later in the year, arrangements for group work were made possible by providing a set of three trapazoidal tables for each of the experimental classrooms (Figures 2-a, 3-a). When arranged in a half circle, the three tables provided sufficient work space for all 10 children while the teacher, seated at the center of the half circle, was able to hold her group and provide individual guidance without moving about the room. The flexibility with which the tables could be arranged also made it possible to provide the same type of working arrangements for one or two separate activities or subgroups. When not in use, the tables were easily moved to the side of the room and concealed by a screen, thus freeing the entire classroom space of non-essential furniture.

The usual paintings, drawings, maps and charts, handwriting guides, school calendars, flowers, aquariums, murals and class projects, and all other types of traditional motivating equipment considered appropriate in a regular classroom, were displayed only in relation to a specific work period or project assignment and then removed. Once the object or objects had served their immediate instructional purpose, they were returned to the storage and supply cabinets. As the year progressed and the children's hyperactivity and distractibility decreased, it became possible for the teacher to increase the number of instructional guides which were left out in the classroom in direct ratio to the degree to which the material could be incorporated in the total day's activity and instructional program. In one group, for example, the classroom calendar and handwriting chart were the first items to become a permanent part of the classroom environment (Figure 3-b).

(It is interesting to report that while the non-stimulating atmosphere was obviously beneficial as a means of assisting highly distractible children to control their impulses and responses to the classroom environment and each other, its effect upon adult observers, whose sole occupation was to sit quietly in the room, was to reduce their mental alertness to a soporific calm. After approximately 20 minutes of observation, visitors to the experimental classrooms were frequently found strolling up and down the hall in a dignified effort to contain their need to stretch and yawn.)

Although a detailed statistical analysis of the pre- and post-test differences between the Experimental and Control groups is provided in a later chapter, it is indeed unfortunate that, for the time being, there is apparently no method by which the significance of such environmental adjustments can be isolated and objectively measured in terms of their contribution to developing organized work habirs and a sense of personal responsibility for instructional materials and equipment. Nor can the assistance provided a teacher in fulfilling her instructional responsibilities to the individual child's particular rate of learning and acquisition of skills be objectively measured. However, one cannot help but conclude that many non-measurable benefits were derived from the modified classroom environment, particularly during the first few months of the academic year. Many of these advantages were reflected in the amelioration of time consuming details associated with good classroom management and housekeeping. As has already been indicated, the development of organized individual and group work habits and organization of instructional materials were all facilitated through the use of lockers, cubicles, and a non-stimulating classroom environment.

Perhaps one of the most important uses made of the cubicles by a number of the more seriously emotionally disturbed children was in terms of their need for a retreat, a shelter perhaps, from which they were better able to deal with their fears and anxieties concerning the external world. One teacher, in reporting the various types of use the children made of their cubicles and in reference to a child with pre-psychotic tendencies, made the following observation:

"If X hadn't had his cubicle at the beginning of the year, I just don't think he could have made the grade. You know, it reminded me of the way tired two-year-olds climb in their crib when they find the world too much for them. Of course, by the end of the year, he used the cubicle as his office like some of the others did at the beginning of the year."

In general, the main differences between the Control and Experimental groups may be summarized as follows:

The classrooms of the two Control groups had no structural changes (Figures 4 and 5). They were typical elementary classrooms. One of the rooms had closed cabinets (Figure 5-c) as did the experimental classrooms. It had previously been a kindergarten room and the cabinets had been used for storing the children's rest mats. The Control teacher used the cabinets in the same way that the cabinets were used by the Experimental teachers. The second Control teacher, who had no cabinets, used designated spaces on a wide window ledge for the prepared and finished work of each child (Figure 4-b). The Control classrooms had no cubicles and no change in color. Shades were lowered and lights used when it was necessary to eliminate outside distractions. Charts racks were used for screening purposes and desks were arranged in such a way as to provide minimum distraction for each child (Figure 5-a). Displays and illustrative materials were minimized. Very insecure children sat near the teacher's desk (Figure 4-c).

The two Experimental teachers agreed to maintain strict

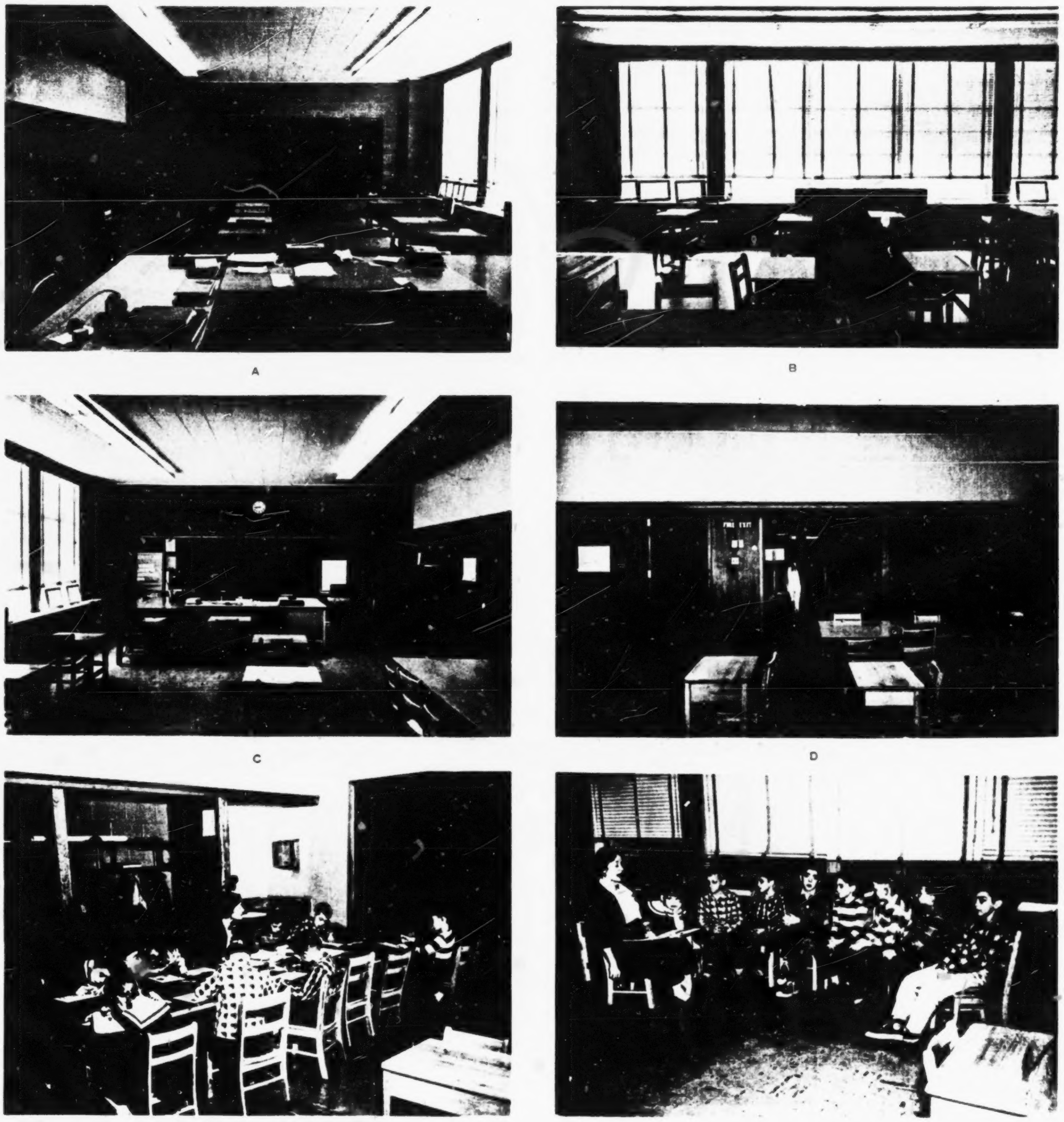
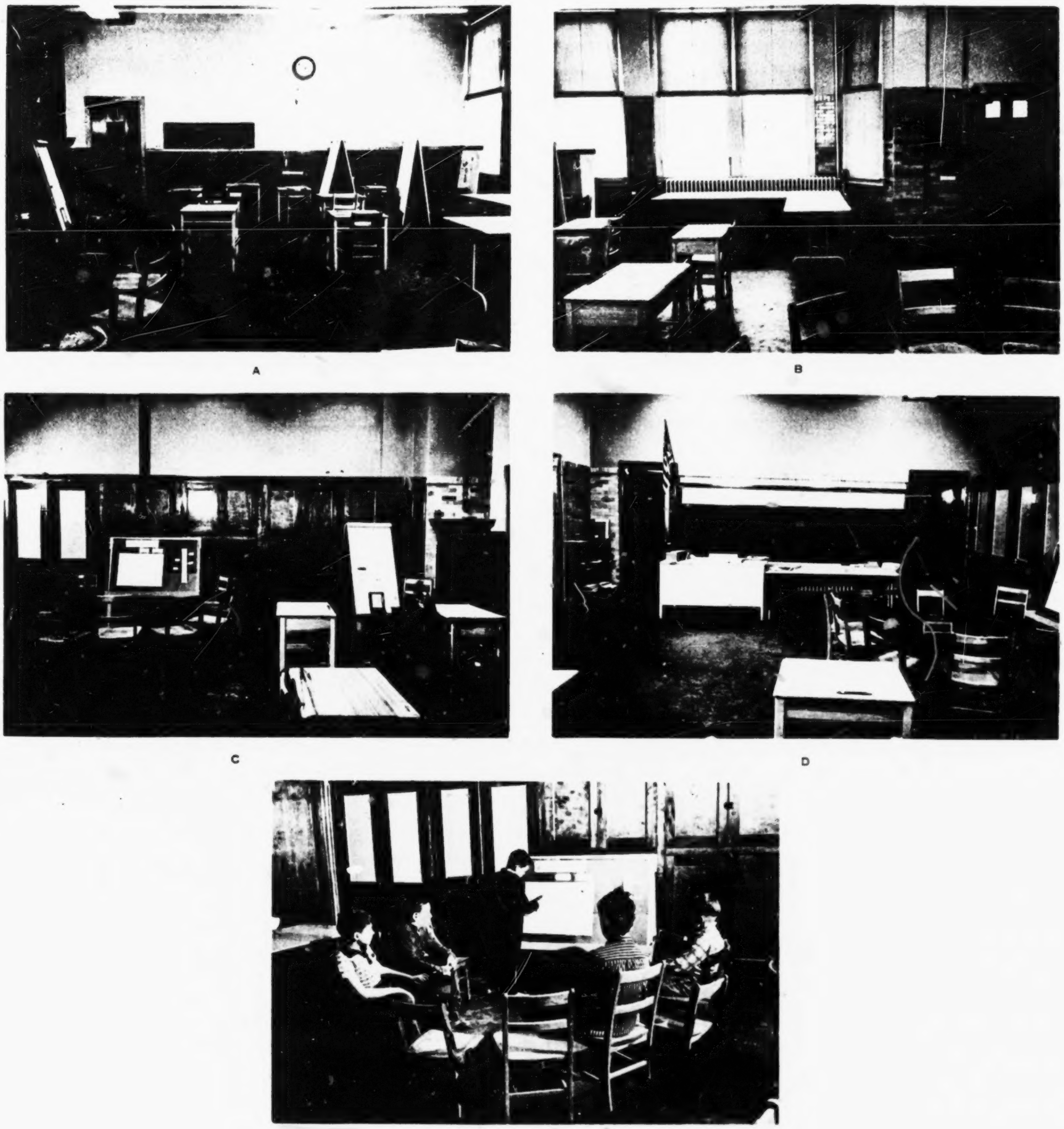

A
B
C
FIRE EXIT
D
E
F

Fig. 4.--Figures 4a - 4f inclusive illustrate classroom seating and instructional arrangements for Control Class 1.



A B C D E

Fig. 5.--Figures 5a - 5e inclusive illustrate seating and instructional arrangements for Control Class 2.

adherence to the specialized techniques and instructional goals. They further agreed to implement any changes in procedures that the project director recommended and to use any additional materials or techniques which might be devised during the research period.

The two Control teachers were free to vary their programming in any way they felt might be helpful to the children in their group, as long as they did not deviate too far from the established educational policies and standards of the Department of Special Education. They were to devise techniques and materials as they deemed wise without direction from the project director.

Teacher Selection

All four research teachers were unanimously recommended by their previous supervisors and administrators as being the best possible choice for teaching a class or child with the particular combination of learning problems and behavior response pattern which characterized the research selectees. All had received past training at a college of education and had been adjudged successful in their previous teaching assignments. Each was creative and experimental in her approach to the use of instructional materials. Two of the 4 teachers had had no previous experience as special education teachers, while the remaining 2 had been instructing special classes for approximately 3 years. One teacher with regular class experience and 1 with special class experience were assigned to each of the control and experimental situations.

The particular method used in the initial selection of the teachers, although somewhat unusual, was a most effective one. The Supervisor of Special Education held a conference with members of the Montgomery County Elementary School Supervisors, and representatives of the Pupil Personnel Department and the Psychological Services. During this meeting, the Supervisor described to the group the behavior disorders and instructional problems of a typical research project child as though he were a member of a regular third grade class.

The kind of teacher the research staff was looking for was described as follows:

First and foremost, the teacher must be professionally competent in the use of the skills and tools of the teaching profession. Second, she should have had several years experience in teaching and possess the skills essential to the management of an average size elementary class of around 30 children. She should be rated by her supervisors and principals as consistently superior in her ability to provide group instruction and maintain a learning environment the children enjoy. She should have demonstrated exceptional ability in meeting the individual and group instructional needs of children in kindergarten, first, second, or third grades. She must have a thorough knowledge and understanding of developmental sequence in the growth and development of children and understand and respect the social, emotional, and educational needs associated with the maturational processes at each developmental level.

She should be professionally interested, curious, and intrigued by the unresolved instructional problems of the times and her attitude toward new and unfamiliar teaching concepts, instructional methods and techniques should be characterized by elasticity, creativity, and professional objectivity. She should be more an eclectic than a devotee of curriculum guides and methods, and she should be able to determine quickly what particular techniques and procedures to use at a specific time with a given child with a particular problem. Since the members of the group she was to be teaching would be easily distracted, have a short attention span, and lack impulse control, her sense of timing and skill at transition devices must be developed to such a degree that the instructional day would be experienced by the children as a smooth, flowing, many faceted continuum of learning.

She must be a good group teacher. That is, she would need to be able to use the group structure as one of her instructional techniques, through which she communicates the skills which, in the end, would make it possible for the children to learn how to learn, independent of the group situation. She would be expected to be able to mobilize all her talent, experience, drive, and professional ability in an almost final attempt to provide previously unsuccessful, disorganized, underachieving children with those skills which would lead to successful experiences and would promote a sense of well-being in positive, well-organized classroom activities and achievement.

The supervisors, pupil personnel workers and psychologists were asked to recommend teachers who could meet these requirements. Four teachers were selected from the names which were submitted. Each of the 4 teachers was independently recommended by 3 or more persons. The project administrators were satisfied that the 4 teachers recommended were matched in terms of teaching strength and professional maturity.

The teacher aide assigned to the two Experimental groups shared the same general background and personality characteristics of the project teachers with the exception of formal academic training in an accredited school of education.

Once the teachers and teacher aide were selected, they were all given a six-week training period in the specialized teaching methodology.[1] This course included theory, methods, and supervised practice teaching. The work included instruction in the preparation of materials and specific instructional aids appropriate to the learning problems of the project children. A demonstration class was maintained and each of the teachers and the aide were supervised in actual work with children.

In concluding this chapter, the authors would like nothing better than to be able to define and itemize the specific factors by which teachers for classes comparable to the project groups can be selected and assigned with satisfaction guaranteed to both the teacher and the children. Unfortunately, the project staff is in no better position to set up such criteria than anyone else who has struggled with this problem. What has been attempted in this chapter is to share the few clues and guides which were found to be useful and helpful in this particular project and which were considered as making a significant contribution in the selection of four master teachers. It may be pointed out, however, that in the utilization of the criteria for teacher selection which have been itemized in this chapter, remarkably wise professional decisions can now be judged to have been made in the selection and assignment of the four research teachers who participated in this pilot study. As such, on the basis of this experience, the criteria used would remain unchanged were these authors to reestablish a second study of the same nature.

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[1] The teacher preparation program was under the supervision of Miss Charlotte Larsen, teacher of brain injured children, Jolliet Public Schools, Illinois, who was appointed as a visiting lecturer at Syracuse University during the program. Only the research teachers and the aide were admitted as members of the program.

CHAPTER V

THE TEACHING METHOD

In Chapter I and in Chapter IV some attention has been given to the nature of the non-stimulating classroom environment. The present chapter will outline in extensive detail the teaching method and describe many of the materials used with the four groups. Information of a general nature regarding the characteristics of the children of the type provided to the teachers is also presented in the paragraphs which follow in the nature of an introduction to and rationale for the teaching materials. In some degree this information is repetitive to that which from time to time has already been mentioned elsewhere in the preceding chapters. In this way the reader will understand the nature of information which was given to the research teachers and which then became embodied in the teaching method. An effort has here been made to translate psychological concepts with the reality of a specialized educational setting. With this in mind the authors do not apologize for whatsoever repetitive material the reader may discern. This chapter should be read from the point of view of the teachers' needs. What do they need to know and how should it be presented? It is in answer to this latter question that the pages which follow present informally and graphically, concepts, techniques, and materials which could prove helpful in seeking to meet the needs of some or all of the children.

The material contained in the present chapter is included in the monograph for two chief reasons. First, its contents essentially comprise the instructions given to the research teachers during the intensive teacher training period. With this in mind the reader is able to see the results achieved in the perspective of the method utilized. Second, since the monograph consists of a report of a demonstration pilot study, it is assumed that in the future a more refined investigation may take place either by the present authors or others. A relatively complete statement of the teaching method and the instructions provided to the teachers is, therefore, a necessary entity to the total report for purposes of later corroborative research.[1, 2]

Why Do They "Misbehave?"

The diagnostic staff could not develop all of the answers regarding the children because not all of the answers were known.

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[1] For the pages in this chapter which follow, the authors are indebted to a committee of six educators who were employed during the summer of 1958 to prepare this material. The group included three of the research teachers: Mrs. Sally Luke Mrs. Jerry McClerkin, and Mrs. Wretha Petersen. These were joined by Mrs. Dorothy Zippermann of the Montgomery County Public Schools, and Miss Ruth Cheves of the Bibb County Board of Public Instruction, Macon, Georgia. The committee was under the chairmanship of Mrs. Miriam Ulrich of the Montgomery County Board of Education, Rockville, Maryland.

[2] The reader is referred also to The Montessori Method, by Maria Montessori, London: William Heinemann Publisher, 1930, for excellent additional suggestions for teaching method. While the Montessori method was not originally developed for hyperactive or brain injured children, much of the method appears to be appropriate for this work and many of the teaching suggestions contained in the present chapter are modifications of those of Montessori.

However, in both the brain injured and non-brain injured groups certain factors stood out clearly. The diagnostic data showed that many children were characterized by developmental delays in sitting, crawling, standing, walking, toilet training, speech and language development, motor coordination, weaning, and feeding. Eye-hand coordination often appeared inadequate. Visual difficulties (not connected with eye pathology) were frequently observed in many activities: fusion--following a moving target with the eyes, periodic divergent strabismus (crossed eyes) under "stress," and related visual-perceptual activities.

As teachers have worked with these children, they have come to talk about "developmental gaps," because the children can do some things well, others poorly. One of the striking characteristics is the wide range of performance demonstrated by psychological examinations. This range in mental age would indicate to a teacher that the formal IQ score would alone hardly be a valid index or measurement of the child's learning potential. In a later section of this chapter it will be shown how the teachers tested each child informally to find out where to begin, and how to determine the child's learning disability so that he could be brought to the point where he could feel success.

If a child has a healthy body,but it won't do what he wants it to; if he has eyes that see, but do not see things the way other eyes see; if he has ears that hear, but haven't learned to hear the way other ears do--he can't tell anyone what's wrong. It is just that he is always wrong. No one can see that he isn't like everyone else, so he is expected to act like everyone else. Suffice to say that these are the things that happen to these children. This is the kind of behavior in a learning situation which the teacher will have to learn to understand if she is to help the child. These are the symptoms of developmental lags in the child's experience which develop into "specific learning disabilities."

Learning Characteristics

Hyperactivity--Distractibility and Disinhibition

The children of this study are apparently abnormally responsive to the stimuli of the environment. They are inclined to over-react to everything around them. When placed in a situation where the visual and auditory stimuli are constant and widespread, they try to react to everything at once and move from one place to another. The individual child in the group cannot fix his attention on any one thing. One is reminded of a toddler who moves from one object to another, picking it up, dropping it, and moving on to the next stimulus. This is appropriate behavior at 21 months; it is not appropriate at 5, 6, or 7 years. This, then, is a control which must be learned. The child must have a place to anchor. As with the young child, all bric-a-brac is removed to a safe place so that the environment is simplified. This enables him to concentrate on the problem at hand.

Another type of hyperactive child appears in this special class. He is the one who sits quietly at his desk, apparently absorbed in work. At the end of the period his lesson is uncompleted. He is judged to be lazy or a daydreamer. This child is attracted by pictures and page numbers in his book, by flaws and marks on the paper, or by any features of the material which are for most children additional or irrelevant. His seeming inattentiveness is the expression of an abnormally attentive condition. If he is to get his work done, he must have nothing to distract him from the job at hand.

Dissociation

Children are often unable to synthesize separate elements into integrated and meaningful wholes (Gestalts). Figures involving interlocking squares or triangles are reproduced as separate and unrelated (see Figure 7, p. 207).

Perseveration

Children with brain injury are among the ones in which the characteristic of perseveration, as a learning and behavior characteristic, is usually most prominent. Perseveration makes it necessary to do a different kind of teaching than the one ordinarily used. If one uses drill or repetition in setting a learning pattern, perseveration is intensified. No matter what new material is introduced, the child may be unable to shift. In reading, a child may repeat a phrase several times before he is able to continue. In writing, a word incorrectly spelled will be erased and may be written again with the same error. In arithmetic, dots or blocks are counted several times. If a page of arithmetic problems starts with a row of problems in addition, the child may ignore subtraction signs and perform addition in every problem on the page. In the use of standardized tests, such as the Metropolitan Reading Readiness Test, the examiner must be alert to the possibility of perseveration. If the correct answer in a given task happens to be the third one, the child is likely to mark the third answer all the way down the page.

The teacher is normally inclined to insist that a paper is correct before leaving it; whereas, if the child is inclined to perseveration, she will need to have him do something else before he can come back to his errors and correct them. There is probably no characteristic more exasperating to the teacher who does not know what she is dealing with than perseveration. One must learn to sense it in all types of behavior and working situations and to develop techniques for dealing with it.

Catastrophic Reaction

Catastrophic reaction is another characteristic that has been attributed to the brain injured person. The child will be working happily and then suddenly may burst into explosive crying or may get up and turn his desk over. This may come because he is confronted with a new task, a slightly more difficult problem, or it may come as a result of success. Catastrophic reactions need to be differentiated from temper tantrums. The outward manifestations are the same but the causes and the management are different. For example: One of the children in the study had a catastrophic reaction to his first reading success. This was handled by placing a calm and sympathetic hand on his arm until the storm passed. The next time the same set of circumstances arose, rather than bursting into crying, the child said, "Put your hand on my arm."

Instability of Performance

Instability of performance is characteristic of all children, and it can be said that everything is a matter of degree. However, it has been a frustration to the new teacher to discover that a skill that appears to be mastered on one day will be approached as if for the first time on the next. Some days a child will seem alert and bright and capable of many things; on other days he will be sluggish, inert, incapable and extremely distractible. So-called "forgetting" is usually the result of lack of understanding. Learning accomplished with insight and understanding is retained; automatization is soon lost. Further cause is irritability toward the environment--weather, minor cuts or bruises, and so on. On such days a teacher gains best results by assigning a minimum requirement and avoiding introduction of any new skills.

The Child and the Teacher

As a group, these children need a special kind of handling that comes with the understanding of their problems. Class games designed to motivate and interest the normal or the familial mentally retarded child are overstimulating for this group. Scolding or deprivations, reasoning, subtle approaches by precept or example are equally ineffectual, since the cause of the reactions and the irritating situations remain. Repeated experiences of failure and the unrelenting demands of school and home have compounded the children's problems. Their first need is a simple, quiet environment where they can relax, and a structure of activities so designed that they know what is expected of them and what they can expect to have happen to them. In this setting they can find out who they are and what they can do.

In this controlled environment the teacher becomes the focal point. It is important that she dress with thought to the effect her appearance will have on the children. Whereas many teachers wear eye-catchers in the way of jewelry and flowers for the children to notice, this teacher will find her problems multiply if she wears something that calls attention to itself. Likewise, any speech mannerisms or an unusual tonal voice quality will lead the child to listen to how she talks rather than to what she says.

Case Studies

If there is one principle which stands out more than any other in the teacher's experiences with these classes, it is the paramount importance of the injunction, "know your child." To know the child--where he is handicapped, where he is strong, how he feels about himself and about the world as he is able to conceive it, and, most of all, how all these factors figure in his behavior--to know these things is to hold the key to helping him.

In one class, for example, are three children who present the same symptom, a habit of making loud meaningless noises. But in no case is the reason for this behavior the same; nor is the cure. Consider the children: Jane (Child E-2-6) one of the few girls, is a mite of a seven-year-old, with piquant, apparently alert face and figure which already charm the little boys. But she has no interest in charming anyone, and in the usual sense is not alert. Confused and terrified by the disastrous experiences which have attended her constant failures, not only in school but in all group experiences, she is convinced that the world is against her, and she is alert only to danger. Offers of kindness and friendliness arouse her contempt and suspicion. Severity arouses her fear; but, a born fighter, she will go down fighting. Her noises warn the world that she is ready to give it back as good as it sends. And she often does so with real physical violence. A combination of unperturbed acceptance--no overt friendliness--and detached firmness ("no work, no playtime") encourage her to remain in her cubicle work unit doing puzzles, her only accomplishment. Between her spells of loud, raucous singing, or shouting, she listens to the background of fun and developing friendships in the room. In the end it is her strengths that draw her forth. She longs for a friend, and characteristically she goes about this too, with her usual do-or-die determination. The chosen one must tell her categorically in the presence of all if she will be her friend. She must tell her not once, but many times. If the writing paper looks too hard; before she can try to answer the teacher's question; a dozen times a day, there is a pause while Jane draws herself together rigidly, and asks in her tight clipped little voice, "Are you my friend, Betty?" Betty (Child E-2-7) is no noisemaker, As a matter of fact, she can scarcely talk. Most of her sentences come out, "Me do this," "Me say that," with what she does or says too garbled to have any meaning. But one day Jane lets her love of music draw her to the group around the record player, only to find her fears return, and to sit with eyes darting like a frightened cat's, looking as if she were not sure whether to run or to hit someone. This time Betty's understanding of her friend's need destroys her own fear, as she leans forward and says in words that anyone could understand, "I'm your friend, Jane." And Jane looks tensely at her, asks for and gets another reassurance,then relaxes and settles back in her chair, a real little girl again.

Joe's (Child E-2-9) noises did not begin at first. His enormous, disorganized eyes looking oddly in two different directions, and his exaggeratedly stiff, awkward movements suggest that he has good reason to feel uneasy, in a world with which neither his eyes nor his body can entirely cope. And indeed he takes no chances. An only child, unaccustomed to other children and accustomed to few adults, he sits quietly at his desk, keeping himself as inconspicuous as possible and doing, as nearly as possible, no work. Loss of playtime is no punishment to him. He is afraid of the large, strange playground good only for activities which he detests,such as running, jumping, climbing, or having to do something with a ball. He chills quickly and hates to be out in cold weather. He cries so hard when required to go outdoors, that for most of the winter he is allowed to stay inside by himself. But he, too, finds a friend, or rather lets the friend find him and accepts the friendship. Later he seems so much stronger that one day the teacher insists that he come outside. She has to pull him by main force, with Joe crying and pleading at the top of his voice, while the children watch open-mouthed at her cruelty. Suddenly she looks down to discover that his eyes are crinkling with merriment and that this time he is playing a game with her.

After this, Joe began to make noises. At first he used only a vexed "ts! ts!" to which he soon added a little stamp of the foot. Next came a piercing "No! No!" at the top of his voice; and finally a large, full-bodied scream. In between these outbursts, he learned, if not to run and play, at least to take a chair outside, and to carry his chair both ways. Later he could be persuaded to play tag with the teacher, and eventually to go out with his friend. He had a success experience with writing and began to do his work. He electrified the class by telling someone to shut up. ("Joe said 'shut up,'" came delightedly from all sides.) Joe's noises were a boast of strength, and he was so much stronger by the time he made them that they could be dealt with as summarily as might be necessary.

Chuck's (Child E-2-10) noises go by the name of conversation. An eager, friendly, little boy, his normal alert curiosity about the world around him is exaggerated by a distractibility which draws his attention to every detail. The perseveration of which he is equally a victim keeps him harping on the subject long after anhone else has ceased to care. "Are we going out to play today?" "What are those notices about?" "When can I show the toy I brought?" A dozen times in a morning he asks the same question, over and over. When the group begins a new activity, he talks incessantly, trying to inform himself on every move which he is about to make, expressing his pleasure or displeasure.

Chuck is not afraid, in the sense that Joe and Jane are. His cute little-boy appearance and friendly ways have done much to cushion the difficulties of not doing well in school, and his parents have devised many ways to give extra support at home. He seeks and finds three or four willing best-friends in the weeks when Joe and Jane are making contact with one, and finally settles down to one real chum and several cronies.

He does have some uneasiness about his inadequacies with numbers, peg boards, parquetry block designs, and his probable inadequacies in new situations. These fears are by no means always justified; but his distractivility and vocal perseveration are especially pronounced in such moments of tension. His therapy is found to be the protective devices which are standard for this type of group. The room must be free of the physical stimuli that provide fuel for ever more questions. He must have a place to work in solitude. Alone he can be quiet and often industrious. The cardinal injunction to go slowly in work, with the child giving the cue, has a special importance with Chuck. He is one of those children whose performance fluctuates mysteriously (even his vision and neurological pattern fluctuate, giving totally different responses in the same tests at different times). For this reason, a pattern of work with which he is entirely comfortable for many weeks, may, with no apparent reason, show him suddenly irresponsible, do-less, unhappily protesting that everything he knew before is "too hard"--and talking a mile a minute.

Here are three children with a common symptom; but each has his own distinct pattern of causes,not quite like that of any other child. For each one the teacher must begin with the basic reasonableness of his reaction to the world as he sees it, and proceed from there to rehabilitation.

Problems of Instruction

Bender says, "Children with severe reading disabilities show lags in neurological patterning . . . they are awkward in motor control . . . Motor tone is more variable . . . general behavior is disorganized and impulsive; motor perceptual patterns or capacity to develop gestalten remains primitive and full of motion and fluidity; personalities are immature, impulse driven and dependent . . . They also suffer from anxiety and feeling of inadequacy . . ." (1, p. 158) These, then, are problem areas of instruction in the research classes.

Motor Control

When observing a class in this study, one of the striking impressions is the great number of scarcely noticeable physical disabilities. Almost without exception, this is a group of apparently physically "normal" children, generally attractive and personable. Closer acquaintance, however, is likely to show one boy who stands or sits with every muscle stiff, his arms held rigidly at his sides; two others who have a habit of rising to their toes or walking on their toes; still others who wave their hands and forearms in the air in moments of excitement, much as a baby or toddler does. Some move in a slow, clumsy shamble, and cannot follow directions for simple movements such as crossing arms over chest, hopping, or extending arms or feet in a given direction. To introduce a simple exercise period for the first time is a really startling experience. Arms, legs, and heads go in every direction but the one specified, and the sheepish, embarrassed faces of the children show that they have no more idea than the teacher where a given motion is going.

On jungle gym and climbing bars, the group as a whole is far behind the usual level of performance for its age. Even the most ordinary motions are unpredictable and full of mishap. A child moves eagerly to the cupboard and bumps into the teacher's desk; tries to pass a pile of papers and half of them fall to the floor; waste paper dropped into the basket misses it and hits the floor. The sound of scattering pegs and falling chairs is a daily occurrence in the early weeks and spills at lunch time are common. Frequently someone stumbles and nearly falls even in walking across a room.

Increasingly in working with these children, the realization grows that these are not accidents in the sense of being isolated, unrelated occurrences. The succession of small mishaps and inadequacies is the result, in part, of the fact that even in large muscle situations, the child does not notice the things around him. He can *see* the teacher's desk when it comes to his attention. But he does not *notice* it as part of the total Gestalt of the room. When he is thinking of the cupboard he notices the cupboard and only the cupboard. When he stacks dishes at lunch and puts a saucer on top of a cup or a large plate on a small dish, he can *see* the dishes. But he does not *notice* more than the one which catches his attention. Nor does he observe the difference in *form* of a cup and a saucer which make the safer way of stacking so obvious.

Here, as always, the difference is a matter of degree. To be sure, any group of young children has its share of spills and mishaps. But when day in, day out, eyes do not notice the bulk of a desk or the shape of a cup, it becomes clear that they must have even greater difficulty with the shape and arrangement of letters and numbers.

In general, the stumbling, tumbling, bumping, spilling, dropping that goes on reminds one of a group of much younger children--sometimes kindergarteners, sometimes even those in nursery school. For the sake of emphasis, the foregoing discussion deals with failures in large muscle activity. There are, however, many similar disturbances in the area of speech. A child cannot protrude his tongue to say "th"; or cannot move his tonge from side to side or up and down as directed in the process of making specific sounds; cannot purse the lips.

Here again, the over-all impression is one of almost bizarre immaturity. It is not unusual to have a child speak of himself habitually in the third person. Speech sounds are inaccurate or babyish even where speech organs are physically perfect. The children make less use of complete sentences than groups of comparable age.

Even in play they can lean toward activities popular in first grade, kindergarten, even nursery school. Toy cars and trains are in great demand. Play with blocks attracts restless children who have been interested in nothing else.

As the medical histories show, many of the children did not do, or did not do until very late, many of the things which are part of the usual developmental activities of infants and toddlers. Some walked without ever having crawled; some talked late, but were too physically active to play with blocks, fitting, piling, or counting toys. Others were inactive physically with little experience in running, skipping, hopping, climbing, and so on. Why they did not do these things is a matter for the theorist. That they did not do them, and which ones they skipped, are matters of great importance in bringing them up to date in academic areas. If a child cannot follow a pencil with his eyes, but must turn his whole head as a baby does, he is at a disadvantage in reading. If he still needs to grasp objects to count them, he will not be able to count merely by pointing, and certainly not with his eyes alone.

Eye-Hand Coordination

One of the ways to evaluate how a child sees things is to have him draw what he sees. Psychologists have been working at this problem for a long time and have partially standardized the performance of the average child. On the following pages (Figures 6 and 7), are samples of the drawings made at the time of the initial testing for the study. These samples indicate both the nature and the scope of the eye-hand problem. Overcoming this problem is basic to virtually all the techniques in this chapter. Drawing a square is required at the five-year level on the Binet. The other items are from the Bender-Gestalt Test for Visuo-Motor Ability. It will be noted that each of these performances falls into the "primitive" level. And yet these same children had been struggling in a regular class to find their places; they had tried to go through the conventional procedures for learning to write and to read. Little wonder they took refuge in "aggressive, acting-out behavior." Crossing a t would have been a major triumph.

Other tests that involve matching and sorting forms, copying block designs, frequently show results that are just as bizarre as those noted in Figure 7. The teacher's use of these tests will be discussed in a later section of this chapter.

Foreground-Background Disturbances

These children often have difficulty perceiving foreground-background relationships. Normally, in spite of murmur and other talking or other sounds, one child has no trouble

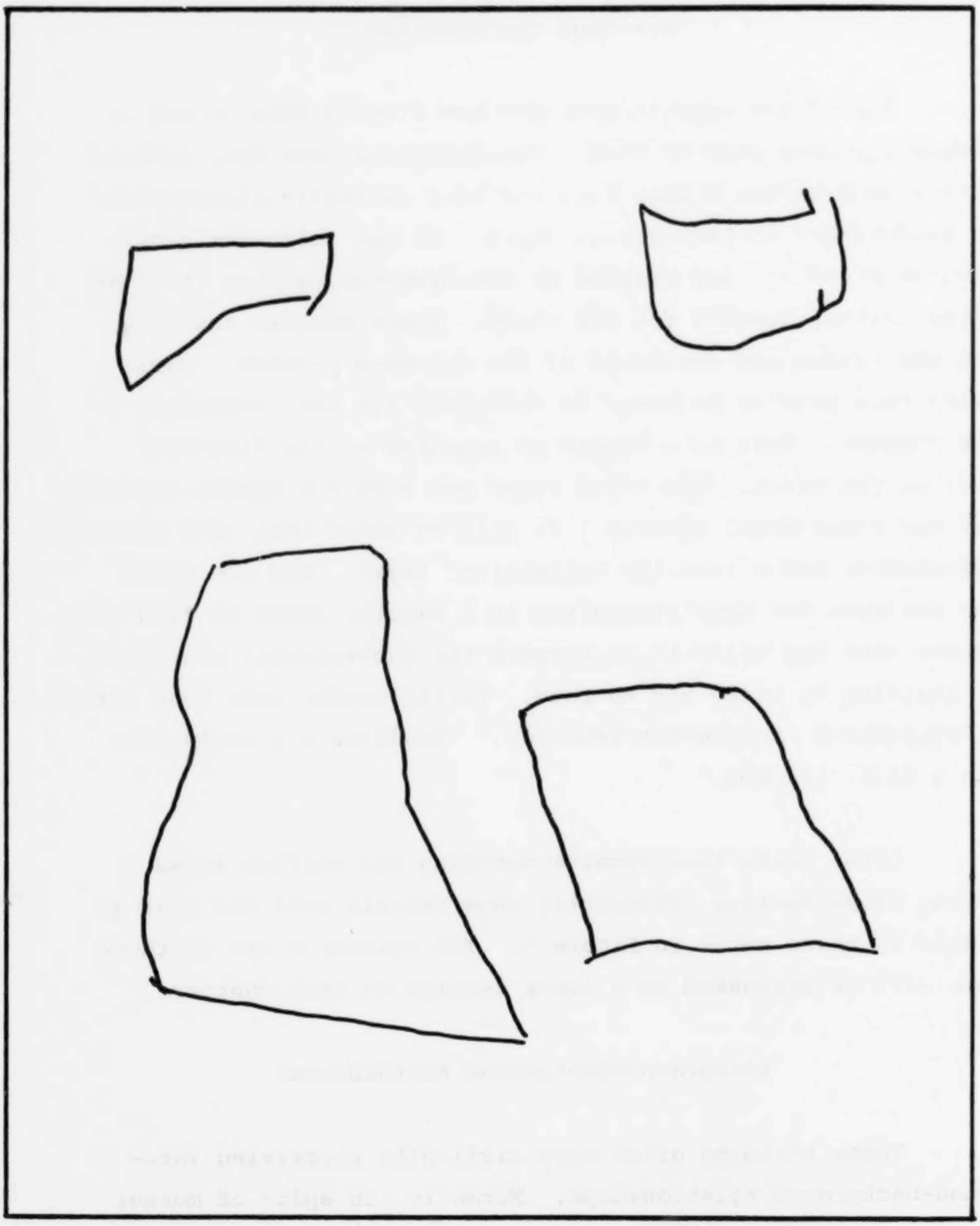


Fig. 6.--Drawing a square is at the 5-year level on the Binet scale. These are drawings of study children between 7 and 10 years.

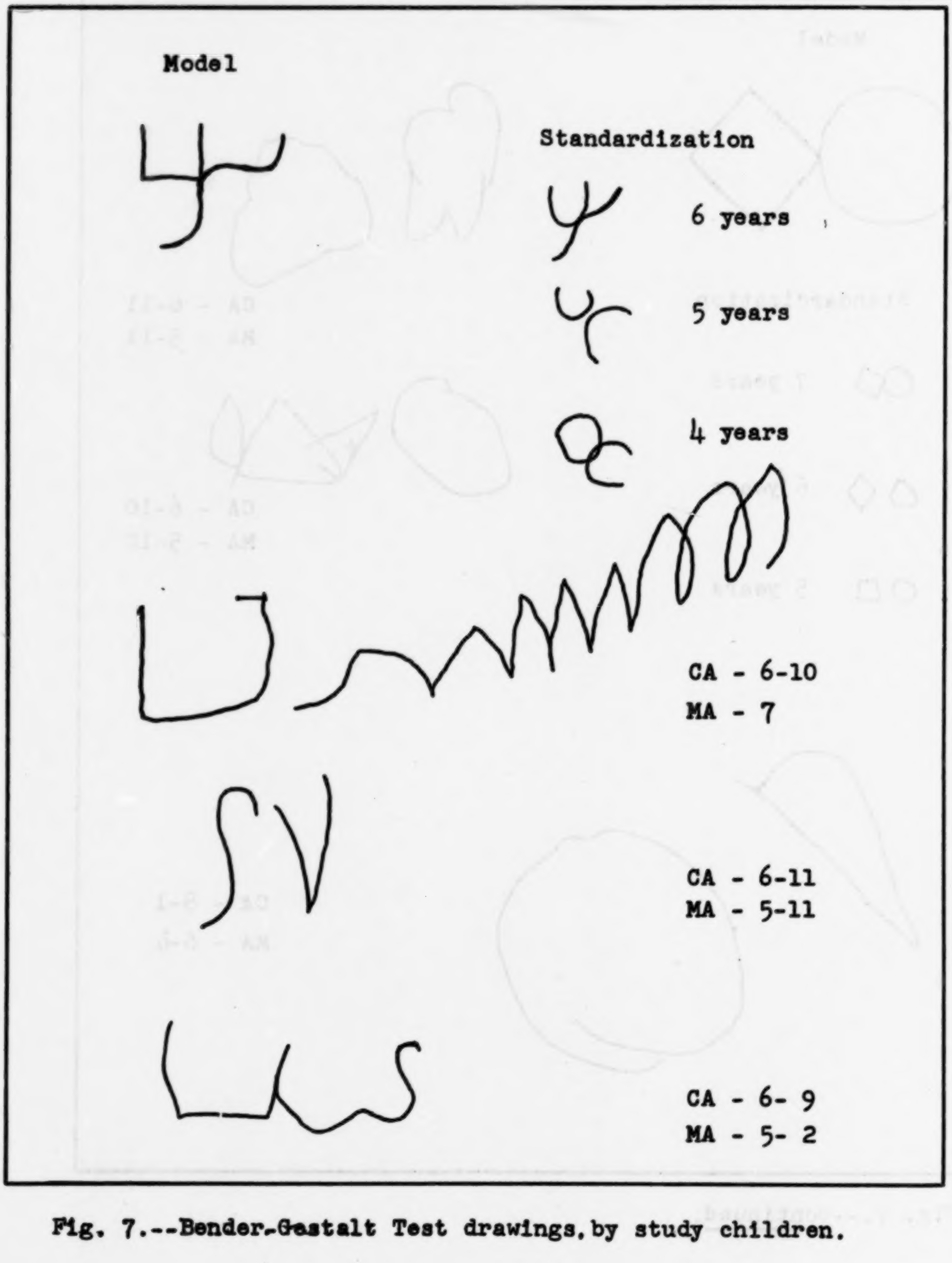

Model
Standardization
6 years
5 years
4 years
CA - 6-10
MA - 7
CA - 6-11
MA - 5-11
CA - 6- 9
MA - 5- 2

Fig. 7.--Bender-Gestalt Test drawings, by study children.

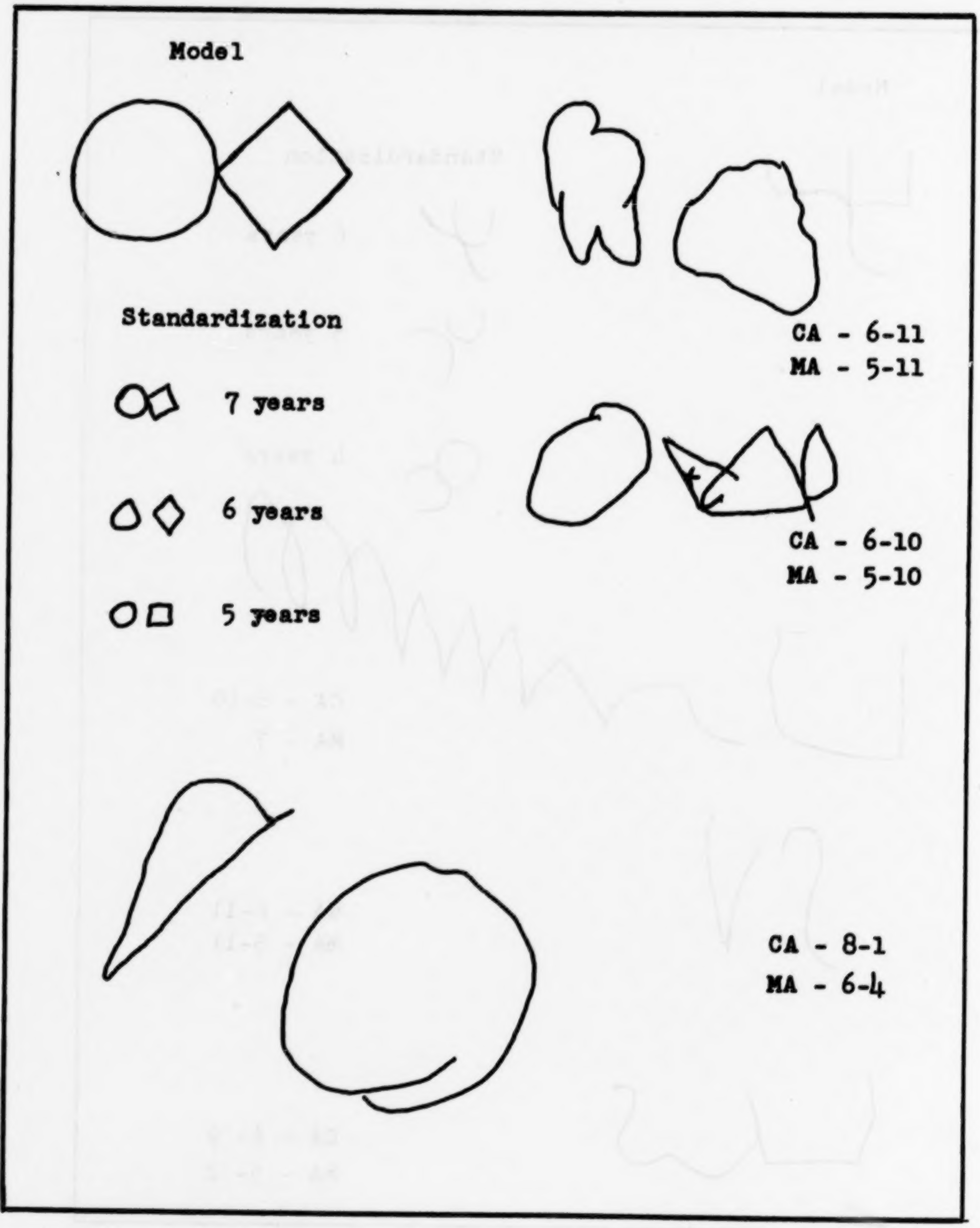

Model
Standardization
7 years
6 years
5 years
CA - 6-11
MA - 5-11
CA - 6-10
MA - 5-10
CA - 8-1
MA - 6-4

Fig. 7.--Continued.

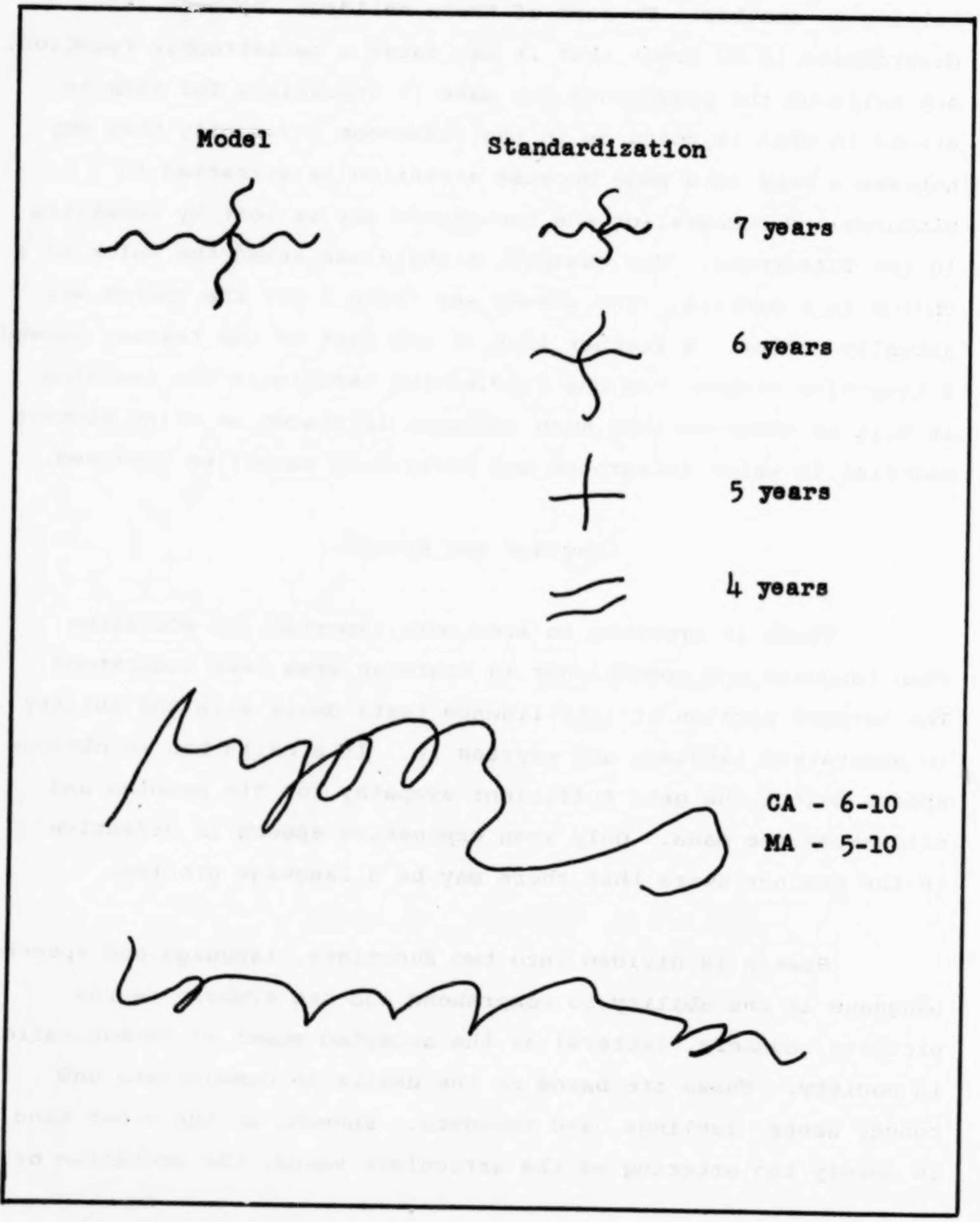

Model
Standardization
7 years
6 years
5 years
4 years
CA - 6-10
MA - 5-10

Fig. 7.--Continued.

talking to another. To some of these children, however, the distraction is so great that it may cause a catastrophic reaction. Any noise on the playground may make it impossible for them to attend to what is going on in the classroom. Visually they may not see a word on a page because attention is attracted to pictures and numbers, or the background may be lost by something in the foreground. For example, a child was asked the color of a church in a picture. The answer was "blue," but the church was actually yellow. A further look on the part of the teacher showed a tiny blue window. As one studies the techniques for teaching, it will be observed that much emphasis is placed on using picture material in which foreground and background cannot be confused.

Language and Speech

There is probably no area more important to education than language and speech, nor is there an area less understood. The largest portion of intelligence tests deals with the ability to understand language and express it. If a child has an obvious speech defect, he gets sufficient sympathy for his problem and allowances are made. Only when expressive speech is defective is the teacher aware that there may be a language problem.

Speech is divided into two functions, language and speech. Language is the ability to comprehend and use symbols (words, pictures, numbers, letters) as the accepted means of communication in society. These are based on the desire to communicate and convey wants, feelings, and thoughts. Speech, on the other hand, is merely the uttering of the articulate sound, the mechanism or tool, serving the higher function of language.

Language can be divided into three categories; inner, receptive, and expressive. Inner language is the symbol system used for thinking, memory, imagination, reason, and so on. At the lowest level it is a simple association between the word and concrete experiences,such as associating the word "mama" with feeding and generalized feelings of well being. Receptive language is the symbol system used to understand the ideas of others. Expressive language is the symbol system used to communicate ideas to someone other than ourselves.

From the standpoint of development, inner language must come first. The average infant must be exposed to spoken language for about 8 months before he begins to comprehend the speech of others. Some associations must be made between experience and the word before the words themselves become intelligible. When such associations have been accomplished to a certain extent, inner language has been sufficiently well established so that receptive language can begin. (In the average child this begins at approximately 8 months.) During the next 4 or 5 months inner or receptive language develop at the same time to the level which makes expressive language possible. This means that at about 12 to 13 months of age the child speaks his first word. It seems that no child talks until he first has acquired inner and receptive language. Looking ahead to the future there is a similar relationship. It can be assumed that no child learns to read normally unless he first acquires oral language. It seems essential that he first be able to understand spoken language before he can learn to read normally.

It has already been noted that speech and language constitute one of the areas of delay in these children. Even if they are without speech, it is possible to test the inner language of children by observing their use of materials, their ability to see likenesses and differences, their ability to arrange a group of pictures into a sequence that tells a story. They can express this inner language by manipulation of materials if they have the necessary eye-hand coordination. Receptive language can be tested by giving directions and observing the child's ability to carry them out. If one says, "Give me the pencil," and he hands you a ball, it is likely that he doesn't understand what is said to him and is responding to the extended hand, understanding only the gesture that the examiner wants something. Or if a child is asked a question about what shoes are made of and he says, "My daddy went to work this morning," one may suspect that he has some defect in receptive language. It is altogether possible for a child to talk because he has learned talking by imitation, without being able to make sense out of what is said to him. This is closely akin to the "word-caller" in reading. The question arises, "If some of these children are unable to understand what is said to them, could this be why they do not 'mind' when given a direction?"

This is a major area of concern in instruction. Just as much that is in the area of form is rooted in visual perception, so are speech and language largely rooted in auditory perception. In auditory perception one comes to select out of the total mass of auditory stimuli certain groups, each of which has a unique quality. In this way one learns to recognize the song of a bird, the sound of the wind in the trees, the ringing of the telephone or front door bell. Still other combinations of sounds come to have significance because they form the sounds of speech. These clusters become the symbols of language as words, phrases and sentences.

In order to perceive Gestalts or patterns of speech one must call upon auditory memory to hold these sound units in mind until the series is complete. If auditory memory is poor, the individual finds it difficult to recognize the speech sounds individually, and almost impossible to remember the longer series of sounds which make up the word, phrase, and sentence. As the infant develops he learns to distinguish between sounds; he learns to repeat them, combine them and give them meaning. Through this developmental process he eventually learns to make fine distinctions between _pat_ and _pot_; _God_ and _dog_; between _pin_, _pen_, and _pan_.

Looking at auditory perception this way, it is possible to see how a child can achieve a perfect audiogram in a pure-tone audiometer test and still be unable to understand speech. In the test, there are no complex patterns of sound for him to analyze; there is no background noise to attract his attention. The child has ears that hear, but he has not learned to attach association to the sounds of speech he hears.

This then is at the heart of the language problem with non-achieving children. As in the field of visual perception it was found necessary to discover the level of ability and help develop the missing steps, so is it necessary to fill in the gaps in auditory training before one can expect to get the sound discrimination necessary for phonetic training in reading. So one must build receptive language and expressive language to the point where one normally expects language to be when a youngster is handed his first book.

Procedures

Determine the Child's Needs

When a child has been referred because of behavior and/or learning disability, it is essential that every bit of available information be gathered about him. There are four areas in which information is needed.

1. The family history should be gathered by a social worker or pupil-personnel worker who is trained in dealing with the home. The teacher will want to have her interview with the parents, but usually parents are reluctant to give intimate data to the person who is to be working with the child. The teacher's chances of working with the parents for the good of the child will be better if she does not get too involved with them at this level. The family is an important source of information and it may be necessary to inform the social worker of the type of developmental information that is desired for understanding the child's problems.

2. The medical history should include information about the prenatal, birth and postnatal factors. This may include

psychiatric evaluation also. The Health Department is the proper agency to work with in this area. The school nurse is an invaluable resource when she knows the kind of help and information that is desired. She can call the family physician or ask the school physician to get the information. Doctors are reluctant to give confidential history to school personnel, but when authorized by the parents to release information they will give it to the School Health Physician who is then in position to interpret the findings. The School Health authorities should be thoroughly familiar with the program for these children so that they are in a position to work with the school.

3. The psychological testing should be done before the child is considered for special handling and teaching. When the psychologist knows the type of information desired and why it is desired, he is most helpful in showing developmental deviations and what the needs of the child are. The teacher will be infinitely more helpful to the child if she can learn to communicate her needs to the psychologist. If she convinces him that it is not the IQ that she is interested in so much as mental age and deviations from the norm; if she asks him what the test data mean in relation to this particular child or group of children, then both the psychologist and the teacher have learned to help the child.

4. The school records of past school experiences are to be studied for any crumb of information. Many times the previous teachers have included samples of the child's work to explain their frustrations. These should be studied carefully

for reversals, spatial relationships, kinds of errors, number of erasures, perseveration, and "unfinishedness." Reading readiness tests and other group tests are frequently in the cumulative records. In these one looks not so much at the final score as how the final score was achieved. Is there a wide range of ability shown? Is there a discrepancy in the language and non-language areas? Was the child retained? Many times the tests show little more than the name and (it is to be hoped) the date. This is information--the child wasn't able to take a test. No matter how much or how little information is gathered, the teacher's final decision as to the needs of the child will come as a result of her own observations and testing. This will be discussed in a later section.

Meet the Child's Needs

If the information gathered on the child indicates that he has the characteristics that make him fall into the group either with brain or central nervous system injury, or with developmental deviations; if it is decided that he is in need of the kind of program suggested here, then it is recommended that he have a quiet, uncluttered spot in which to grow. Because of his hyperactivity, his forced response to the stimuli in his environment, and his confusion of foreground and background, it is best to select a room that is free of extraneous sights and sounds. The preparation of the room will be discussed in the section on classroom management.

Here, then, is the child with all his deviations, his accumulation of failures, and his need for living with himself and his world. Out of all this information, the teacher must determine what he is like now. To do this she must consider what is normal for all children at all levels. The child comes to her as an eight-year-old, for example. What things can he do that a normal eight-year-old can do? Which of his activities are like those of a six-year-old? How does he compare to a child who is five? Does he do anything like a nine-year-old? What are his potentialities and limitations? The proper developmental pattern for this child must be worked out. This is a therapeutic process because of his deviations. He must go on as an eight-year-old, but have therapy where he deviates. The farther the developmental and therapeutic levels are from each other, the greater become his frustrations. One must take note of his mental age and deviations and give help. He is getting special help because his deviations are so great. Consider in what areas he is below his mental age; likewise, in what areas he is on or above his mental age.

A program of instruction must be planned to help overcome the basic and specific dysfunctions which seem to underlie the problems of poor school performance. Therefore, the program must include work that will develop finer muscular control, eye-hand coordination, form perception, figure-background relationships; help in establishing left-right progression and integration of behavioral responses. This is a therapeutic program and as such cannot be justified if the child is allowed to keep on doing only the things he is able to do. One must begin there and lead him through the things he cannot do--step by step up the developmental ladder.

Six factors will help the teacher to start her program.

1. Begin with work where he is able to succeed.
2. Be sure he understands what is expected of him. Do more demonstrating than talking. Make directions concise and meaningful.
3. Be consistent. Plan a program with requirements that can be met. The child will find himself because the teacher has defined his limits clearly and reasonably.
4. Use his strengths to correct his weaknesses and supply the crutches he needs. He will discard them when they are no longer needed.
5. Observe carefully. The child will show when he is ready for the next step or needs to go back.
6. Remember that progress comes slowly. When the child has confidence in himself he will move ahead. He will learn just as much and as fast as he can if the teacher takes her cue from him.

The Teacher's Task

It has been said that the task in Special Education is to close in the deviations of each child and bring him to the highest possible level. This kind of teaching offers a tremendous challenge and one is inclined to think, talk, eat, and sleep these children with their problems and triumphs. A word of warning: Tension transfers from teacher to children very quickly, and these children have had too much tension all of their lives.

This chapter attempts to identify factors that have been discovered individually and collectively in order to make it possible for the teacher to carry out her activities with a minimum of stress. The hours spent in the classroom must find the teacher poised and calm and objective. Throughout the discussion that follows are interspersed warnings of "progress slowly." This means a relaxed pace. The children must not feel hurried.

It is also well for the acceptance of the Special Class in a school that the teacher not carry her problems to the teachers' lounge. It is essential to be constructive in discussing the children. One should share in the whole school program wherever possible, and take a fair share of school duties. One is "special" only in the opportunity of doing an exciting work. One should share experiences with other teachers, but not bore them with every detail. They will ask for information as they become interested.

Further, there is the matter of professional ethics. The teacher in Special Education will have more confidential information at her disposal than most teachers have. This should be guarded as a precious possession. This information is to be shared only when it is for the betterment of the child; confidential material will be discussed only with the professional personnel engaged in working with the child's problems.

Much of what the teacher has been trained to do in normal, educational situations is reversed with these children. For example, whereas in reading the usual method is to start with the whole word (the Gestalt), in this type of teaching it has been found necessary to begin with the part and build to the whole. The child must be taught to see every part of a word. Because of his inability to grasp the Gestalt, he may fix on only one part of the word. For example, if he has happened to learn the word family because of the y, it is possible that every word he sees that ends in y, such as Monday, pretty, and so on, he will call family. The gh in eight may be his clue to this word so that when he sees high, though, night, he will call them eight.

Normally it is not recommended to teach a child to put his finger under each word as he is reading. It is frequently a great help to these children. It may be necessary to go so far as to make a frame for each word so that he can't possibly see more than one word at a time.

Commercially prepared materials are sometimes very useful and great timesavers. However, it will be found that the teachers suggest using these materials by tearing the books apart, cutting out the pictures, or using the printed matter without the pictures. These children cannot tolerate the amount of material put on the commercial book page. The list of suggested materials states: "These books are excellent for cutting up." Further, when old books are being discarded from the school stock, they should be treasured for "cutting up." Adaptation of prepared materials is most important. One can recognize many of the techniques suggested here as "outmoded" according to modern educational theory. They may be the ones that work with these children.

Variety in Techniques

The wide variety of different techniques found in this chapter are helpful in varying the approach to the learning difficulties. This practice of using different techniques to deal with the same problem assists in the development of learning skills. For example:

1. In order to break up patterns of rigidity and perseveration, the following techniques have been found helpful. Drill on such things as number combinations helps to develop automatization with meaning. If perseveration persists in spite of the use of varied techniques of drill, it is well to substitute another activity for a time and then return to the subject later.

2. When dealing with a short attention span, it is helpful to give short assignments. For example, only the number of arithmetic problems that a child can handle is put on his paper; thus he is able to finish the entire assignment because it is within the range of his attention span.

3. Utilize all of the senses in the approach to learning. The child learns through using his whole body and self.

4. Motor disinhibition can be used to the child's advantage by providing materials of learning which involve muscular movement, such as the abacus and peg boards.

Classroom Management

Part I, Preparation

Choice of Classroom

If there is an opportunity to choose a classroom for teaching this special class for children with specific learning disabilities, there are several things to be taken into consideration.

It should be located away from the main work and play areas of the school, both from the standpoint of the noise and from people moving about outside. Hence, a room on an inner court would be advantageous. Opaque windows are desirable; these can be achieved by painting over the lower part of the window. Venetian blinds are very distracting; some children become involved in the lines, patterns of light, or movement. Window shades that blow about can ruin an otherwise peaceful environment. Opaque glass should be on the doors to the hall, also, so that movements there cannot distract.

Color appears to be an important factor. The experimental classes of the study were in rooms that had the wall and fixtures painted as nearly the color of the school furniture as it was possible to get. The lower parts of the windows were painted in the same color. One of these rooms happened to have a tile floor that was almost a perfect match. The room was so free of stimulation that observers had to struggle to stay awake. The only contrasting note was the chalk board, and this made it possible to hold attention there when in use. The control rooms were regular school rooms: one in an old building, the other in a modern one.

Although class size may vary, a sufficiently large room is desired so that the busy hands and feet cannot reach out to touch anyone, but small enough to keep stimuli to a minimum. There also needs to be several work areas available. A room that is too large can be just as unsettling to these disturbed children as one that is too small because they need the feeling of having limits set. The teacher should avoid having an "all-purpose" room assigned to her unless arrangements are made for partitioning it to room size.

It is helpful in cutting down on stimuli and other distractions if the room has an adjoining bath, sink, and drinking facilities. It also allows for a degree of independence in an otherwise structured day.

Lighting and heating equipment should be of high quality. Flickering lights or banging radiators are distracting.

Room Equipment

In spite of the blandness of such a neutral environment, the group situation itself may be too disturbing for many children. In order to limit further the number of distracting influences, the child may be moved to the edge of the group by placing his work table in contact with a wall, so that his back is toward the other children. Strauss and Lehtinen (1) explain that the reason for the separation is explained to the child, making certain that he understands that its purpose is not punitive but constructive--to help him "work better where other children won't disturb him." For a very hyperactive and disinhibited child they "have even resorted to the expedient of isolation behind a clinic screen."

The present study advocates going a step further and having a cubicle for each child. This procedure was followed in the experimental classes. All children could not tolerate the enclosure and worked better with the desk-to-the-wall arrangement. This is the exception rather than the rule in experimental classes. Each child has his "office" where he goes to do his work free of distraction. Each child seems to know when he needs to withdraw from a group and do his work there. These cubicles are in no sense punitive. He can "calm down and be happier when he is alone."

The teachers of the control groups used blank walls with chart racks and other natural barriers for the children who seemed to need isolation. It would be an advantage to have folding screens to use in a classroom where cubicles were not available. The lighting must be adequate in the cubicle areas.

Cabinets and other storage space are particularly important in the classroom where extraneous stimuli are eliminated. The experimental rooms had cabinets built in so that each child had a place of his own to keep his work, a place where work could be closed away and out of sight. The rooms had ample shelf space in the closets and files that could be closed out of sight. The importance of such equipment cannot be overstressed. The teacher can organize her work and have it always ready. The children's work is in their cabinets and ready for them. Only the work being used is in sight at any time. With almost every child at a different level there is still enough material in the room to keep it looking like a classroom.

In the control groups the teachers did not have the cabinets. One teacher put an extra chair beside each child's desk with his work on it. The other used a large table with a box for each child.

Furniture will, of course, fit the child. In the cubicles, tops may be put over the desks so that there will be a large working area, with less chance of things falling off. For group activities trapezoidal tables may be supplied. This makes an ideal working situation because the teacher can be within arm's reach of several children working on writing or other group activities. The formica top of such a table makes an excellent work surface for many activities. One can readily see from the examples (Figure 8), the possibilities for group experiences with a position for the teacher to keep control and with enough separation for the children.

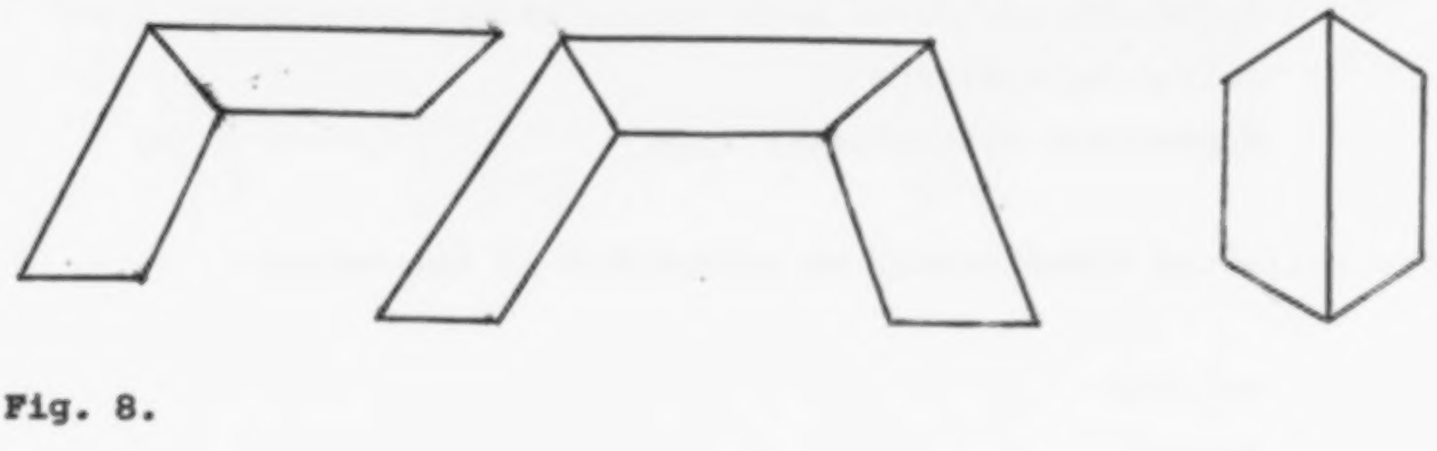


Fig. 8.

Black chalkboards with yellow or white chalk are preferred. It should be observed that blackboards are kept free of daily schedules and old work. Only the work being attended to at the moment is ever placed on these boards.

Bulletin boards that are regularly installed in rooms should not be used for displaying the children's work until late in the school year and then only for a specified time and experience. They can be covered. In experimental rooms, cubicles were built in front of the bulletin boards. Bulletin boards in the hall outside the room are most satisfactory for display of class work. The hall display makes it possible for everyone to share in the children's activities.

Instructional Equipment

The teachers in the experimental classes of this study were privileged to have the following items for their own use. They considered them indispensable.

Record player
Tape recorder
Filmstrip projector with tachistoscope attachment
Full-length mirror
Typewriter with primary type

The following items should be accessible in the school:

Records
Piano
Metronome
Rhythm instruments

Mats
Autoharp
Tone blocks
Movie projector
Opaque projector

Instructional Materials

A suggested order for instructional materials and where to get them will be found in the Appendix. The use of these materials will be discussed in the proper context. The list presented here will help the teacher for the succeeding sections on methodology.

Colored inch cubes, 1/4 inch cubes
Large and small wooden beads
Mosaic color blocks
Parquetry blocks
Large dice blocks
Pegs and peg boards
Puzzles
Magnets and magnet boards
Large pocket chart
Seat pocket charts
Flannel board
Abacus (one for each child, specially constructed so that beads can be removed and put on as teacher sees need. See Appendix for directions for making.)

Ten's board
Hundred's board
Number rack
Numerous teacher (or parent) prepared gadgets
Picture stamps
Workbooks to cut up for pictures
Print set for words and pictures
"Magic Markers"
Individual jars of paste and brushes
Specially prepared paper (samples included at appropriate places)
Books and workbooks (These are discussed in detail in the chapter on reading, and lists to order are in the Appendix.)

Teacher Assistant

Because of the type of behavior encountered with this group of children, with their hyperactivity and motor disinhibition, and because of the need for constant and close supervision, and the large amount of material to be prepared, it has been stated that an assistant is highly desirable. The assistant needs everything in the way of personality and understanding that the teacher has. She is a teacher at heart, but does not have the professional training and experience that makes her eligible for the position.

The assistant is there to help the teacher achieve her goal--to carry the child to the highest possible social and achievement level for him. It is important that the teacher take the time to explain why the children act the way they do and why she handles the program the way she does. Outside of the study, errors were made when an assistant felt the teacher was being too strict with children. When she had them alone for a "break" she thought it would be nice if they had some fun. If she had been briefed on the teacher's reason for handling the children as she did, she would not have lost her effectiveness with the group.

The children recognize the assistant as one who was there to help them, that the teacher was the authority figure, and that the assistant expected them to do for her exactly what they would do for the teacher. Consequently it is important that the assistant be a person who is a part of everything that the teacher is and does. There can be no conflict between these personalities, for the children are quick to sense it and take advantage of it.

Usually the assistant spent a good part of her time in preparing materials for class use. As she learned the procedures she was most helpful in working with individuals or taking a group for an activity, so that the teacher could do individual work or have a brief rest period.

If the school budget does not allow for an assistant for these classes, it is possible to use willing parents to assist in preparing materials. The parent should probably work on the materials at home. The children should not be aware that she is in the building. At no time would it be considered wise to have a parent of one of the children as an assistant in the room; should she come to school to get her assignment or deliver materials, it should be at the end of the school day so that there is no opportunity for a break in the day's routine or the emotional tone of the school setting.

The "homeroom mother" can be of great assistance to the teacher in many ways, telephoning to explain any change of schedule, planning holiday parties, and so on.

Classroom Management

Part II, School Begins

For the Teacher

The class has been assigned, the room selected and equipped, the materials ordered and in place, and the teacher reports to school to make her final preparations. The beginning of the school year with these children should be different than with other classes. To begin with, most of these children have had a traumatic experience with school--at least with group experiences. Whatever their past experience has been and whatever their reaction has been to it, they have been told that they are going to a different kind of class. Consequently, arrival at school should be a different kind of an experience. Further, the teacher has a different kind of a job to do. She must find out for herself what the child's educational needs are so that she can begin at the proper place for each child.

It is to be hoped that when the administration of the school system has agreed to set this type of class in operation, they have understood the problem and the program involved and will permit flexibility in the scheduling of such a class. If one thing has stood out clearly in the research classes of the study, as well as in experimental classes held in other areas of the country, it is the method which has proven most satisfactory for getting the school year off to a good start. This is the matter of staggering entrance by bringing in one or two children at a time. In this way the teacher can study them, test them and get them working at their level before the next ones come to school. This is a point that must be understood and agreed to by the parents when a child is accepted for placement.

Scheduling

If the teacher has had a part in selecting the personnel of the class, she will be familiar with the children, will have studied all of the data, and will know which ones she wants to take first. Otherwise it will be necessary for her to study the data that have been gathered for her before she can make out a schedule. She will want to consider which children she can probably get to a degree of independent work easily. For as she gets one child to the place where he can take his day's work and attend to it with a minimum of help, she will be ready for the next. When she has made out a schedule for the order in which she will take the children, she will call the parents and tell them. It is to be understood that appointments cannot be made far in advance, because until the teacher and child have begun to work together, she has no idea how long it will take. There have been classes where this reception program went on for 6 weeks. The teacher must be convinced that what she is doing is for the best of all of the children because she will have to keep reassuring the parents of the last arrivals that in this way their children are really going to profit the most.

The teacher new to this type of class will probably find she can work best with one child at a time. The experienced teacher may want to have the whole group on the first day of school and then take two at a time until all have been tested. (If transportation can be arranged, it would be highly desirable to take one child in the morning and one in the afternoon. Such an arrangement would bring the class together as a unit at an earlier date.)

For the Parent and Child

An appointment is made for the parents (preferably both of them) to bring the child in. The parent must understand that her coming in is required; no exceptions can be permitted. The purposes of the conference are as follows:

1. to establish rapport with parent and child,
2. to relieve any misapprehension on the part of either of them,
3. to test and observe child to find where to begin his program,
4. to explain the school program,

5. to suggest attitudes to be established at home,
6. to get further information needed to complete picture of child,
7. to answer parent's questions.

How to Conduct the Conference

To begin with, this conference is child centered. This is his school and his schoolroom, and he is to feel a part of it right from the start. Even though he has learned to react to such situations with a shout of bravado, basically he is very uneasy about the situation. As soon as it can be done gracefully, he should be told that this is a get-acquainted time - and the testing and observation begin. One does not sit with pencil and paper to write down every word. However,he is used to school records and tests by this time, and he must know the teacher needs to put down some things so that she can remember all about him. Notes taken at this time are important for later evaluation of progress. Questions of a personal nature are likely to make him very uncommunicative, so it's probably better to begin with a task that is easy and fun for him.

Testing the Child

Throughout the testing, watch for preferred hand, coordination (walking, writing, and so on), fatigue, distractibilaty, perseveration. Also observe speech and understanding of directions.

If a child fails a task given him, the teacher must ask herself - Why?

Did he understand what was expected of him?

Were too many elements presented at once?

Was the material too distracting?

Did the activity lack structure, so that foreground could be confused with background?

Was the child's perception fragmented?

Did he lose sight of the whole by fixation on details?

Did he seem to understand but fail because of perseveration?

Sorting.--

1. Sorting colors.--Put two small boxes and a number of clocks of different colors on the table in front of the child. Put a red block in one box and a blue one in the other. Ask him to "put all the blocks like this in this box and all the blocks like this in this box." If he is not able to do it, do not correct him (he is being tested, not taught); try another pair of colors. If he is unable to select two colors from many, try putting just the two colors of blocks before him.

2. Sorting forms.--Use the same technique as for color but use differently shaped beads, parquetry blocks, or the form cards as in Figure 13 and have him sort according to form.

Eye-hand coordination.--Copying forms: Make a set of test cards. Use 4 x 6 inch cards and put each of the following forms on a separate card with heavy black lines (Figure 9). They are arranged in order of difficulty. The square is a test at the 5-year level, the diamond at the 7-year level.

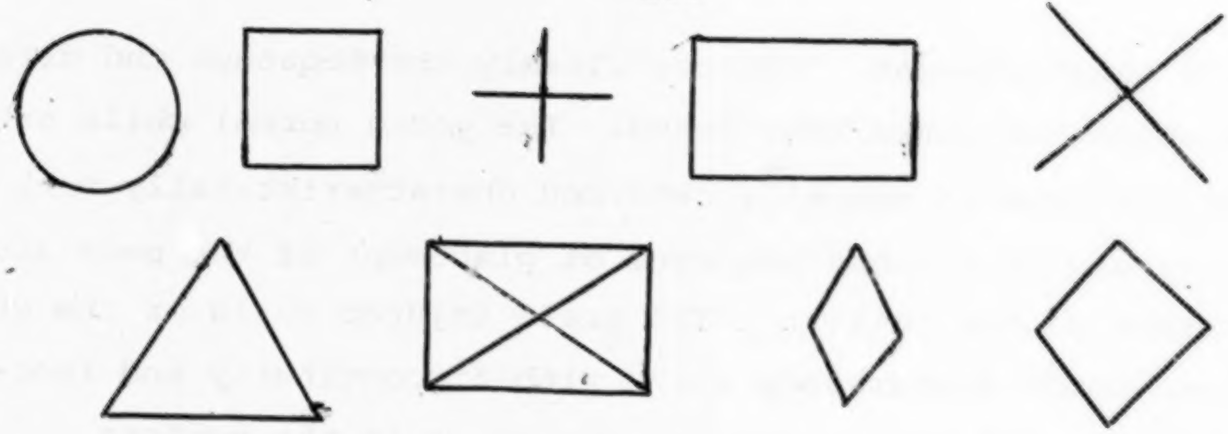


Fig. 9.

Give the child a sheet of paper and a crayon or pencil and have him copy the forms as you present them one at a time. Observe how he gets his results.

Does he need help with vertical, horizontal, or oblique lines? Is he able to make corners, to make lines come together? Inability to perform in this area may indicate need for peg board and stencil work.

Puzzles.--Give him a complete puzzle. Can he tell you what the picture is? Take out the pieces and ask him to work it. If this seems too complicated a procedure, try him out on one of the puzzles in Figures 14 and 15.

Peg board design.--Set up a peg board with the design seen in Figure 21. Give him another peg board and pegs and let him copy the design. Try to take note of the way this test is performed. Does he work in an organized way or are the pegs put in at random? After he feels that he has completed his work, remove his board and ask him to "draw a picture" with the teacher's model present. Observe closely the sequence and direction in which the lines were drawn. The young normal child or the familial type of mentally retarded characteristically work in an orderly and continuous sequence of placement of the pegs along the outlines of the pattern. The brain injured child or the child with visuo-motor disturbance works with discontinuity and incoherence. He may start or stop at any point in the pattern, placing the pegs in a sporadic and erratic fashion without regard for continuity or the squares of the pattern.

If he cannot handle this peg design at all, this is a good clue for working on peg boards.

Parquetry designs.--Have him do a parquetry design as described and illustrated in Figures 25, 26, and 27.

Coloring.--Present a page torn from a coloring book and ask him to color it. Can he stay within the lines? Does he have any sense of form? If he is unable to stay within the lines, then stencil work is advised.

Writing.--"Can you write your name on these papers for me?" "Can you spell any words that you would like to write for me?" Watch for the way he writes, the direction of strokes, does he reverse any letters? What is apatial relationship between letters? Have him copy a word written by the teacher.

Language and vocabulary.--"How old are you? Where do you live? Do you know your telephone number? What is your daddy's name? What does your daddy do? What is mother's name? Tell me about your pets, and so on." How does he express himself? How does he see his world? Can he tell you a story about something he has seen or done?

Reading.--Have him sort letters as described in first steps in reading procedure. Can he see the form of these? Does he indicate that he knows their names?

Give him words to match to Dolch cards. Can he see form of a word? This is a good point at which to run through a few Dolch basic vocabulary cards as a check on basic vocabulary.

Give him a story sequence in pictures and see if he can arrange them in the correct order and tell you the story.

Have him tell a story of a picture that you show him or ask him to relate the story of "The Three Bears," and so on.

If there are indications that he can read or has at least had reading experience, give him appropriate material to read and question him to see if he understands what he has read.

Arithmetic.--Have him count blocks. Observe whether or not he can touch a block for each number.

"How far can you count?" "You know lots of numbers. Give me 3 blocks, 4 red blocks, and so on." Does he have a number concept?

Number content questions: "You are alone here today. Monday there will be 5 more boys. Do you know how many there will be then?"

"Can you write a 5? An 8?"

Have him do sorting with numbers.

These are the areas of information in which the teacher will seek information so she will know how to plan the first day's work. All of these suggestions will not be used for every child, and perhaps only a small part of the testing can be done the first day. The data will give a clue as to the degree of sophistication she is likely to meet. It is always safest to start testing at a low point because the purpose of this test is to find the level of performance--to find those deviations that have caused the difficulty.

When the child has reached a stopping point, the teacher may give him something from the "free play" materials to entertain himself with while she has her conference with the paretn. (Be sure that he does not use these test materials for play. He is to learn that they are for work.) The rest of the testing can be done when the child is at school by himself.

Summary of Conference

By this time the parent may be very comfortable because she knew all the time that her son could not do these things. There will be other parents who will explain that the child was just nervous, not used to the teacher and consequently did not perform up to his ability. "He knows all of those things. He has played with those things all of his life. There really isn't anything wrong with Joe at all." The teacher may need to ask the parent why the child has been assigned to this group.

This is the point at which a careful explanation of the purpose of the program and how it is to be worked out must be given. The parent should get the feeling that school people do not think they have all of the answers. "This approach to learning problems has worked out very well with many children. So are as we know now, we think this will help your child. We will do everything in our power to meet his needs, but we never make any guarantees. Many people have spent many, many hours studying your child so that we may bring the best possible professional skill to helping him. We ask two things: One, that you have confidence in us and know that if this does not work out, we will be the first ones to say so; two, that you give us your full cooperation and try to carry out your part of the program."

The parents' part in the program may be explained in the following terms:

1. Understanding the child's needs and meeting them.
2. Recognizing his need for acceptance as he is and not pressuring him for high scholastic attainment.
3. Becoming a good listener and observer in order to find out what the child is really like. "Do not ask him what he has done at school because he probably can't tell you. You will learn this through observation and listening."
4. Calling the school when there are questions about the school program or child's progress. Asking that the teacher call at her convenience.
5. Helping the child to become independent by not overprotecting him and permitting him to do as much for himself as he can.
6. Attending all conferences and meetings that the school feels important.

Classroom Management

Part III, School Routine

When the teacher has a child alone on his first day in school, she will begin by teaching him school routines. He will learn about the school, will be taken through the daily schedule, learn where things are, and what is expected of him. Testing will continue until the instructional level can be determined and his approximate developmental pattern worked out.

Organizing the Work

In the beginning most of the child's work will be on a perceptual level. The developmental stages for such activities are presented in the chapter on the instructional program. This will include work with peg boards, color cubes, parquetry blocks, stencils, and puzzles. Some task from each of these activities will be included in the daily planning. Such activity will be continued at progressively higher levels as long as there is any need for it. When the time comes when no such activity is needed, the child should be ready to move on to a class for normal children or, as his ability indicates, to a special class for children with less severe learning difficulties.

For a child needing a beginning level of work, one day's activities might include the following:

Sorting color	(block forms), p. 255.
Puzzle	Figure 14
Stencil	Figure 18, Stencil (a)
Peg board	Figure 20, Peg Board (b)
Block design	Figure 23

As the child learns to do more kinds of work, the teacher begins to plan a program that will include some work in each of the following areas:

1. Perceptual training,
2. Writing,
3. Arithmetic,
4. Reading.

Two kinds of plans are needed for this class: individual plans and group plans. Teachers have found that a folder for each child simplifies the individual planning. It will be necessary to plan by the day for some time, though a day will come when plans can be made by the week.

Each child's work will be prepared in advance so that it is ready and waiting for him when he enters the room. He will know where to find it, for the teacher will make sure that he has a place of his own. He will know how to get his material, what to do when he has finished and where to put it when it is completed.

Managing daily work

With many of these children it will be necessary to give out one piece of work at a time in the beginning. To some, the sight of "all that work" to be done would discourage them and they would not be able to begin the first piece. In order to reduce distractions the teacher must take the work to the child. His greatest need may be to learn to stay in one place until a task is completed.

It is important that the teacher see that the child succeeds with each task. In case the child becomes frustrated, the teacher needs to stay close by and see him through. When such a situation arises she should ask herself:

1. Did anything happen before the child left home or on the bus?
2. Has anything happened in the room?
3. Is he testing me?
4. Was the work too hard?

She may need to change to an activity that will divert him so that he does not perseverate in his behavior pattern.

Keeping records of daily work

Too much emphasis cannot be put upon the importance of anecdotal records. Whenever the child makes a response worth noting, it should be written down immediately and dated. Noting time may be important also. If a child has an emotional outburst, for example, at the same time every day, it may be necessary to change his schedule. Observations may be put on the planning sheet or kept in a notebook with a page for each child (see Figure 10).

Records of this type are important for several reasons. First, it is a guide to the teacher and a morale booster; she can see where she has come from when she feels no progress

Mary Smith Age: 7 years, 6 months	
Perceptual:	
9/9/57	Simple peg design - 1 color - 2 sides. No difficulty.
9/10/57	Color within black crayoned lines. Terribly upset. Insisted on scribbling alone. May need to drop this activity. Try stencils.
9/20/57	Block designs - 6 blocks - 2 colors. No difficulty.
Writing:	
9/12/57	Tracing colored lines. Well executed.
9/30/57	Tracing half-rounds in black. Go back to color. How well does she see? May want to refer for visual evaluation.
Arithmetic:	
9/16/57	Matching domino configurations. Gave too many. Try with 1 and 4.
Phonics:	
9/20/57	No sense of sound discrimination. Work on auditory perception. Confer with speech therapist.
Motor:	
9/18/57	Couldn't hop on either foot. Tried jumping. Appears afraid to leave floor.

Fig. 10.--Example of anecdotal record.

has been made. A later problem may have its answer in earlier records.

Progress reports are frequently requested by a supervisor, principal or doctor. These records make it possible to write a meaningful report. In the parent conference or in reporting to parents, such records make objective reports possible and believable.

The best record of any child is his own work. It has been found best to keep these papers for the parents, as an over-all view of the child's work. To send work papers home seldom accomplishes any real purpose unless the parent can understand what is being accomplished and what it means in terms of the child's development.

Setting the pattern for a day's work

A carefully planned schedule for the day's activities needs to be made and adhered to. Consistency in the program helps the child to become organized. He is no longer anxious or fearful of what is to come next, because he knows what is expected of him, how to do it, and when. When the routines of the day are set, the environment becomes a quiet background. The foreground is the task at hand. He learns exactly where to put his coat, hat, the material he uses, and his finished work. He learns what to do first, second, third.

The teacher must be consistent in her demands; what is expected one day is expected every day. The tasks given to the child are within his abilities so he can be expected to succeed. Her instructions must be structured, brief, and clearly understood. She is firm but supportive. She supervises as closely as possible and checks every piece of work as it is finished. The child will learn to wait his turn at his seat until she can get to him. She has him correct his mistakes unless it appears that the task has been too difficult for him to perform. Then she gives help and makes note that the next project must be within his range. Each task is finished correctly before he goes on to the next. He must learn the sense of accomplishment of a job well done.

Time limits may help the structuring and speed up activity. Arithmetic must be finished by morning recess; writing by lunch time, and so on.

Teaching the Class

Up to this point the individual has been emphasized. The teacher will take advantage of every situation to teach to the individual's needs, and one of his greatest needs is to be a member of a group. The most difficult problem the teacher has when she begins in this type of program is to meet the needs of the individuals and still maintain a class structure. "What is their common denominator? How can I make a class out of these emotionally disturbed, hyperactive, aggressive, acting-out children?"

This is one of the chief reasons for her bringing them in one or a few at a time. In this way she can teach the rules of the class, build the group slowly, and keep the situation controlled as she builds. The schedule for the day will be carefully planned to include some activities that will be interesting for all and within the range of every child's capabilities. In the beginning all activities will be very highly structured. There will be no question in anyone's mind about what is to be done. The teacher doesn't ask, "Would you like to do so and so today?" At this stage these children do not really know what they want to do; they need to be told. No question arises about succession of turns. A system should be developed for selecting leaders, for example. One successful method is to make a name card for each child with a number of it. The cards are rotated so that each child knows who is to be leader for the day.

Outdoor play periods need to be planned. The children should know before they go outside what they are going to do. It has been found helpful to do an activity inside before going out. Limits must be known and understood.

"Are these children never to have any free play?" The goal is to develop controls from within, but first he must learn to follow controls from without. With decreased interference from disturbances comes an increased responsiveness to the learning situation. Control of behavior makes learning possible; knowledge gained makes possible more effective control of behavior. The measure of how far the group can go in free play or in games is the ease with which they can be brought under control again. If the excitement perseverates, they have gone too far. The controls must be rigid at first, just as the room is free of all distractions.

Group activity

Each of these children needs to strengthen his self-image, his sense of personal worth. Until he is comfortable with himself it is not likely that he can be successful in peer relationships. It is necessary to set up the room so that he is not distracted by the other children. As he grows in stature with himself, he will be able to move in with his peers. There are times in the day when almost everybody does the same thing at the same time. Listening time will draw in most of the group at the beginning. Lunch time will find most of them wanting to be a part of the group. The teacher will watch carefully for every clue that the outsider wants to move into the group. She will watch for signs of a friendship blossoming that can be encouraged as a move toward group activity. Two can be considered a group for instructional purposes. For some, a group activity lasting 5 minutes indicates real progress.

The use of the film strip projector has proven to be a most successful device for working with the class as a whole. In the darkness of the room the projected story is important to the most withdrawn child. He can move toward the group without feeling that anyone is noticing him. The use of a darkened room also significantly further reduces environmental visual stimuli.

The tape recorder has likewise proven a good instrument for developing group activity. Teachers find that having the children sit on the floor in a group for such activity works well if each child sits on his own mat. In this way they have to keep a distance between them that discourages intermingling of busy hands and feet.

One of the best periods in the day for developing group feeling is the lunch period. "We eat together. We talk together. We work together (setting the table, stacking dishes, trays, sorting silver). We learn about health. We learn about manners." This program should be structured as carefully as the rest of the day. If an assistant takes over occasionally to give the teacher a rest, it will be with understanding of the purposefulness of the lunch activities.

Other activities that are conducive to group work are counting, language development, auditory training. telling time, work in art or music, motor training, and experience trips.

The presence of an assistant teacher makes it possible to do a more successful job of teaching. The assistant can take care of one individual while the teacher is working with a group. It has been found helpful to have an "acting out" child taken from the room for a period of time until he can calm down.

The Special Class as Part of the School

When a principal accepts this type of a special class for his school, he does it with the understanding that the children are in this group because they have not been able to conform to the usual school routines. It may be necessary for the teacher to further his understanding by explaining the nature and needs of these children. Since this class is therapeutic in nature, one of the goals is to help the children overcome their difficulties so that they can gradually move back into a regular program. It is hoped that the school will welcome them to all activities when they are ready. The teacher should be free to develop a schedule for her class that meets the needs of the children rather than the routines of the school. Such a group may not be ready for elaborate opening exercises with the salute to the flag, a patriotic song, and so on. They need to be readied for this activity. A school assembly may undo days of work and personal growth experienced in the structured classroom. The cafeteria experience can be so stimulating that the children who walked quietly into the cafeteria are wildly excitable for the rest of the day. These children should be permitted to have their lunch in the classroom, using this as part of their educational program. It is often necessary for this group to have a different time for outdoor play or a protected area on the playground because of the distractions and noise. Principals are most sensitive to these needs and are helpful in arranging such variations in schedule.

Two exceptions to rigidly kept routines are fire drills and air raid drills. Tolerance for safety routines must be built up. Understanding the purpose, extra practice in knowing exactly what to do and where to go, fits in with the children's structured program. With proper training, the deviation in routine has seemed to inspire them to adhere to this kind of active regimentation with pride, and they have given excellent performances. The teacher will need to expect behavior interruptions in the children after returning to the classroom following these emergency interruptions.

The teacher will want to enlist the aid of the principal in limiting interruptions of class activity. Visitors, including parents, should be strictly limited in the early months. Parents will be invited in for observation when the teacher feels that the individuals in the group are ready. The usual visiting week in November is probably too soon for a new class. On the other hand, the teacher will want the children to learn to accept professional personnel such as the principal, psychologist, supervisor, or speech therapist who are part of the team working for the children. Children can learn to accept these people as part of the environment and continue with their activities if the teacher can also accept such presence without comment. In one class the teacher preferred to have the speech therapist come to the room for the children. When the therapist entered the room she would walk to the child wanted and touch him on the shoulder. All but one child accepted this without notice: all but Jane who has been mentioned before. Jane did not go out for speech but she resisted the departure of any other child. "You can't have John. I won't let you have him!" Jane, too, finally learned to accept this interruption as part of the routine. This was as important a part of Jane's learning as any other activity.

The Instructional Program

Part I, Materials of Instruction

The responses of children with perceptual problems can be directed or organized through the use of special instructional material and devices. The way these materials are constructed depends upon the particular problems each child possesses. One must not mistake the devices and materials for the method itself. Although the materials are used extensively, they are but one means of reaching the child. Unless the teacher thoroughly understands the child's problem and knows what she hopes to accomplish by using a teaching device, she will have little success. No matter how many ideas are presented here, the teacher must always be alert to the need for a new device that will reach a particular child. No school, no classroom, no instructional materials are of any value without the teacher. She is the core of the program.

Many of the materials for training eye-hand coordination will be seen to be similar to the educational toys designed for the preschool level. They include peg boards, puzzles, form boards, stencils, blocks, and so on. In the regular classroom these materials are usually on the leisure-time activities shelf; not so here. These are materials of instruction and should be given to the child for a definite reason. At no time is he to be allowed to "play" with them in the classroom. Children ready for school activities are assumed to have vidual-motor skills, spatial relationships, sound discrimination, and language fairly well developed. However, testing has shown that many of these children are at a very low level perceptually. Hence, teaching must begin at a pre-academic level, i.e., learning to distinguish form and sound.

It has frequently been pointed out that no two children are on the same level of development. Therefore, all the steps suggested in this chapter may not be needed for all children. To be on the safe side, it is better to take nothing for granted, but to start all children at a low level. Materials interestingly created will attract even the most sophisticated eight- or nine-year-old, and with them he may have his first experience of success in a school setting.

Goals in the Preparation of Teaching Material

The teacher tries to provide motor activity which engages the child directly in his task, and which fixes his attention on the process involved. She tries to create materials that are self-tutoring, so that the child is helped to become independent of the teacher. She designs materials that are free of unnecessary detail, that do not distract the child, and that enable him to focus his attention on the task at hand. For example, she uses only simple forms. The child is to think of color or form, and is not to be distracted by cats, trees, or rabbits.

The Instructional Program

Part II, Teaching the Child to Coordinate Eyes and Hands

In testing, the teacher will probably find most of these children inadequate in visual discrimination. If they cannot distinguish forms such as squares, triangles, and circles, it will be almost impossible for them to do formal work in reading, writing, and arithmetic. The teacher must therefore find very elementary tasks for the children to do, tasks which will develop their ability to perceive shapes and forms in a more definite way; tasks which help them to see the whole of a picture instead of only a part of it; and tasks which are so simple that they can be performed successfully.

Sorting Color and Form

Color

"It has been found that color perception and responsiveness to color remain intact in spite of the severest disturbance of perceptual and general integration . . ." (3, p. 137). Thus the teacher can rely heavily upon color as a means of reaching these children.

For example, cut 2-inch squares of colored construction paper, using only the 6 primary and secondary colors, and mount them on cardboard (see Figure 11). Have the child sort them according to color. The following numerical code will be employed to designate color on all figures, unless otherwise indicated:

1 = Black
2 = Brown
3 = Red
4 = Orange

5 = Yellow
6 = Green
7 = Blue
8 = Violet

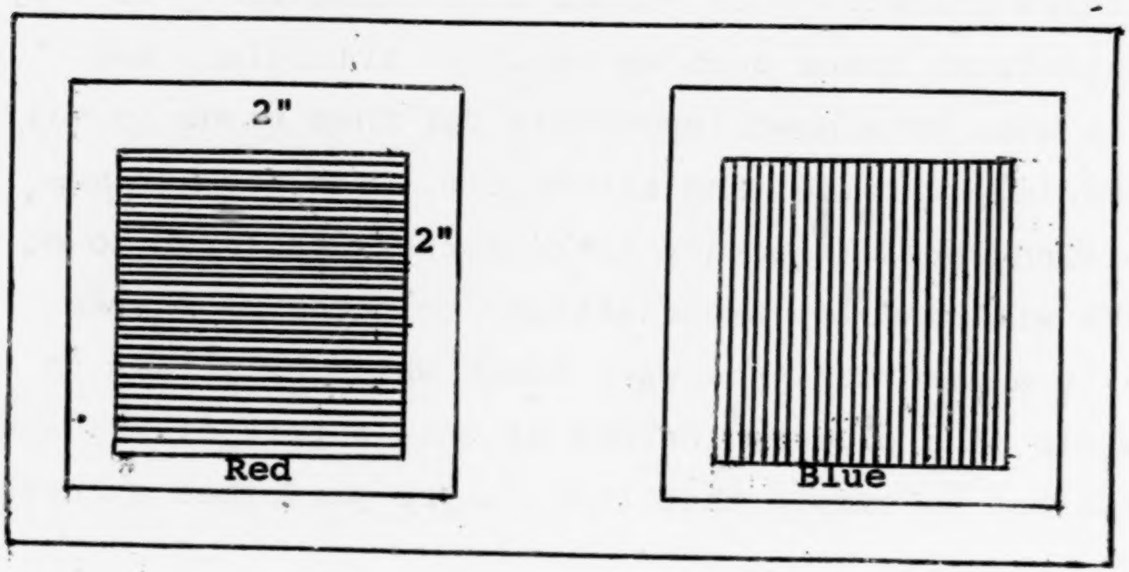


Fig. 11

Make colored dominoes (without spots), using 2-inch squares cut from construction paper (again only the 6 primary and secondary colors), and mount them on cardboard strips 2 by 4 inches (see Figure 12; these cards are identical to the cards of Set B, described in the section on Arithmetic). The child is shown how to match color to color, as in dominoes.

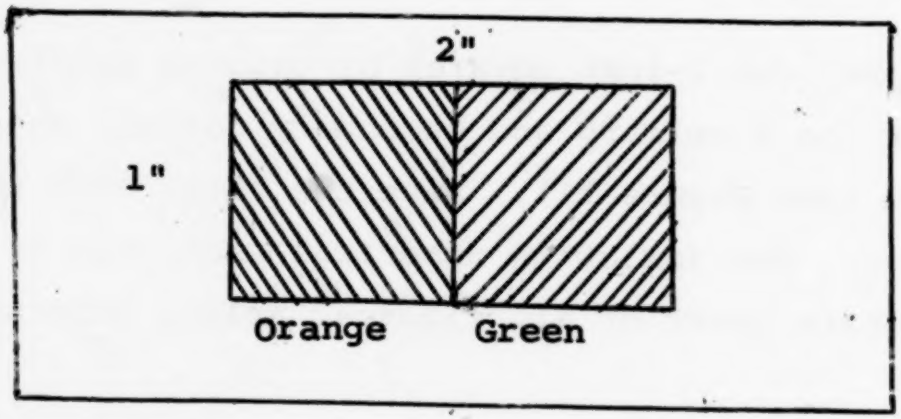


Fig. 12.

Block forms

Use large nursery beads. Give the child 2 or 3 red square beads and 2 or 3 blue round beads, for example. Have him sort them according to color. To enlarge on this activity, add additional shapes in different colors, and perhaps use parquetry blocks as well. At a later stage, mix the colors within the shapes: red, blue, and yellow squares, for example. And finally, plan other similar sorting activities according to shape.

Paper forms

Cut squares, circles, and triangles (Figure 13) from colored construction paper, and mount them on cardboard. Have all the squares blue, all circles red, and so on, then mix them together. The child is then asked to sort them according to shape; the color becomes only a clue.

Have each shape cut in different colors. Mix them, and have the child sort them according to shape; now the color offers no clue.

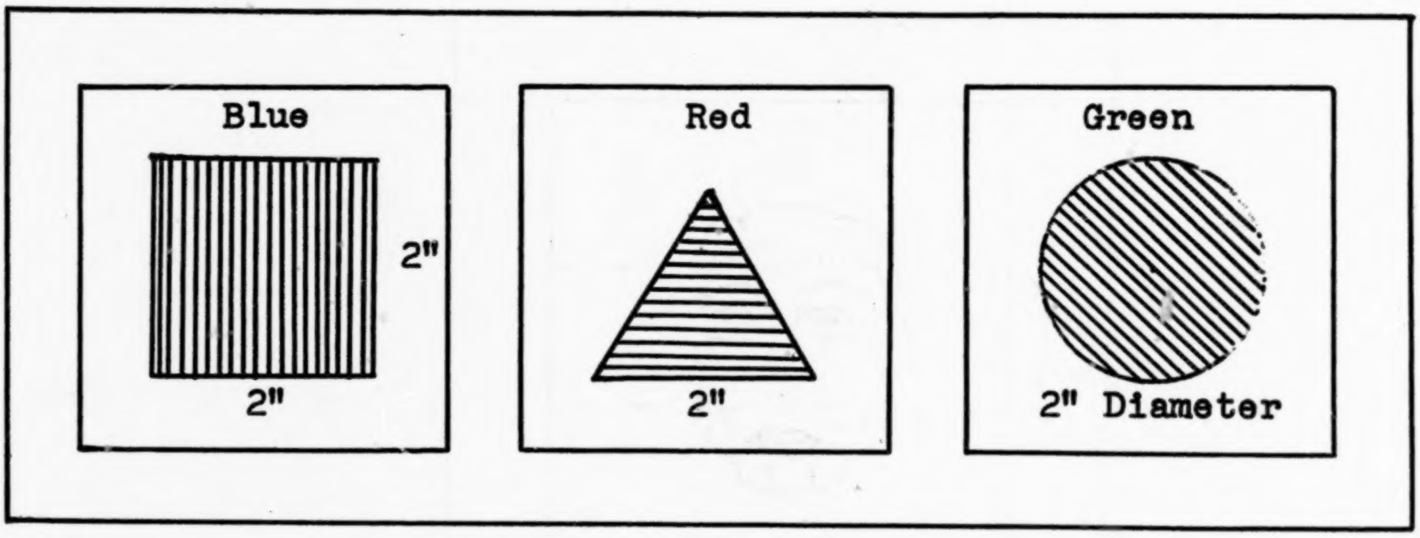


Fig. 13.

Finally, have all shapes cut in the same color, and ask the child to sort them according to shape. Do not use more shapes than he can handle.

Puzzles

Teacher-made puzzles (reduction in dissociation) are more successful than commercial puzzles at this point because they have the simplicity of line that is needed. The puzzles should be cut in such a way that the child sees the entire picture immediately. He should see the picture as a whole first. (Clean-cut pictures without background may also be used.)

Teacher-made puzzles

Faces.--Draw a face and mount it on cardboard. Cut it into 2 pieces across, each the same size; into 3 pieces; into several pieces (see Figure 14). Have the child assemble the pieces in each case.

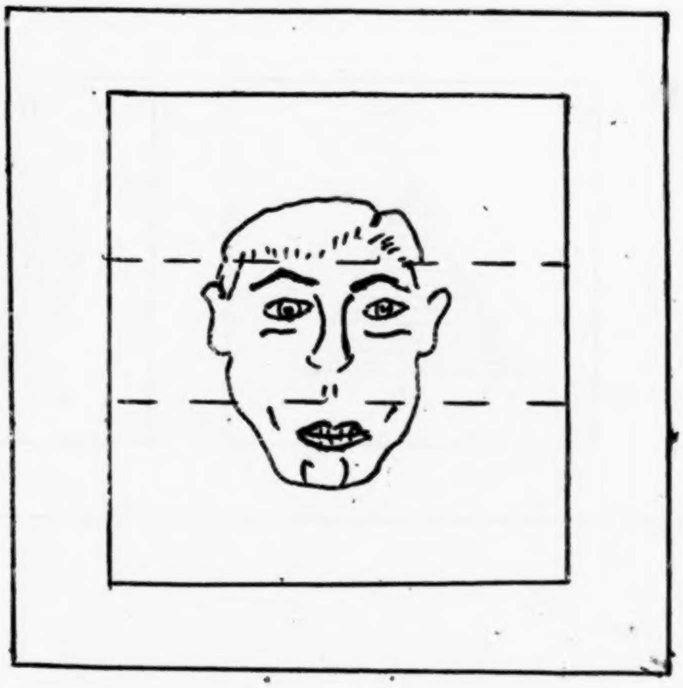


Fig. 14.

Bottle.-- Mount the picture of a bottle and cut it in half virtically (see Figure 15). Have the child place the parts in the proper positions.

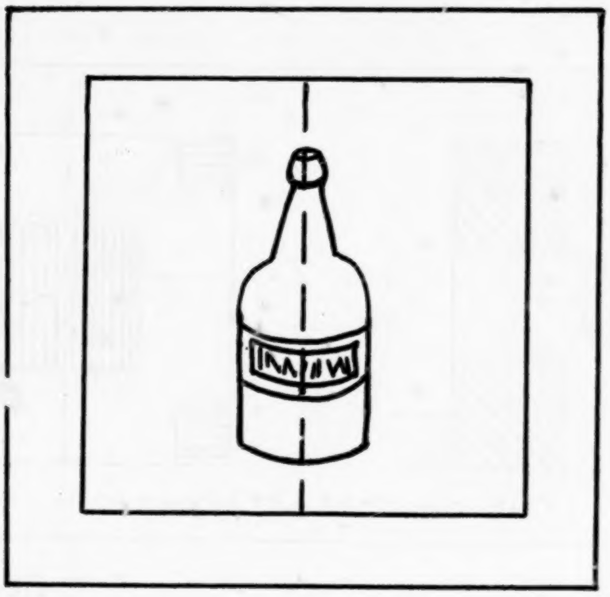


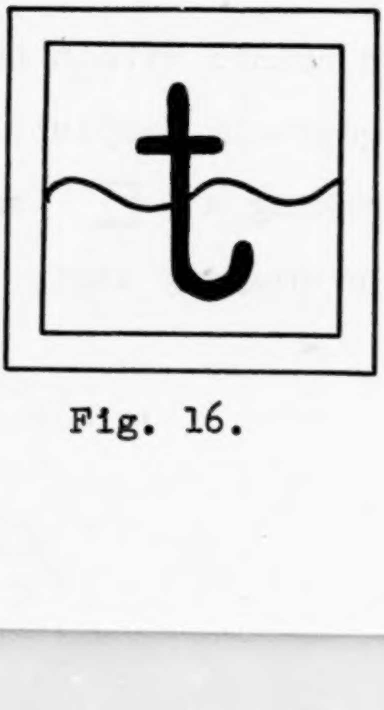
Fig. 15.

Animals.--Cut each picture along the neck line, and have the child assemble the pieces.

Man with hat.--Cut the pictures along the line of the crown, and have the child "put the hat on the man."

Circles.--Use the same principle with a circle cut into quarters.

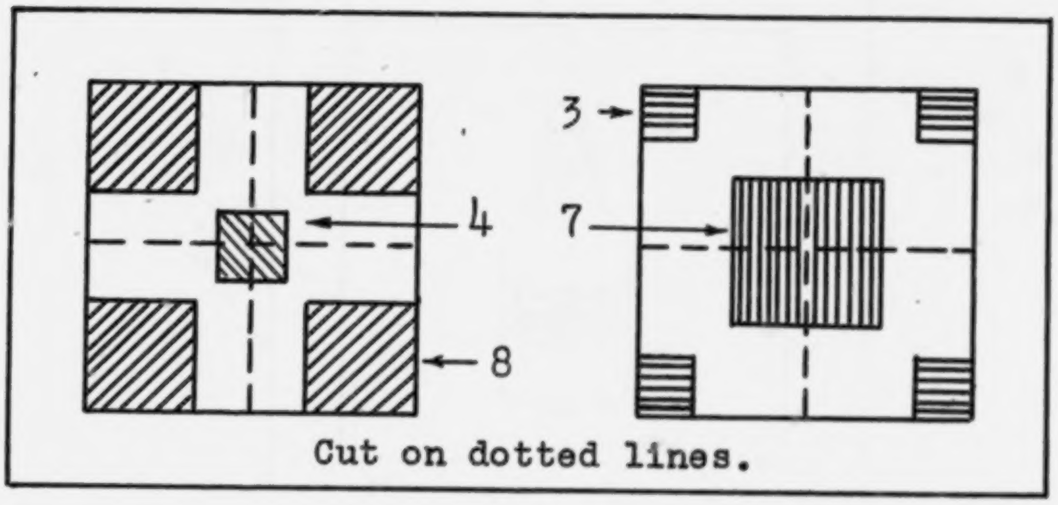
Letters and numbers.--Cut them in various ways (see Figure 16), and have them assembled by the child.



Cut on wavy line

Fig. 16.

Colored-pattern squares.--Draw several squares with designs similar to those in Figure 17; mount them on cardboard, cut them into quarters, and have the child assemble them.



Cut on dotted lines.

Fig. 17

3 = Red
4 = Orange
7 = Blue
8 = Violet

Commercial puzzles

Commercial puzzles, from the simplest to the more complex, are useful. Always keep in mind the need for a plain background and the child's need for seeing the whole picture.

Stencils

The first stencils should be made of strips of heavy cardboard or corrugated board, and should not be too small (see Figure 18, a to e). The child colors within the frame, and the teacher makes sure that the square is completely colored.

Remove a side strip, making a ⊏ -shaped stencil, and substitute a heavy line for the missing strip.

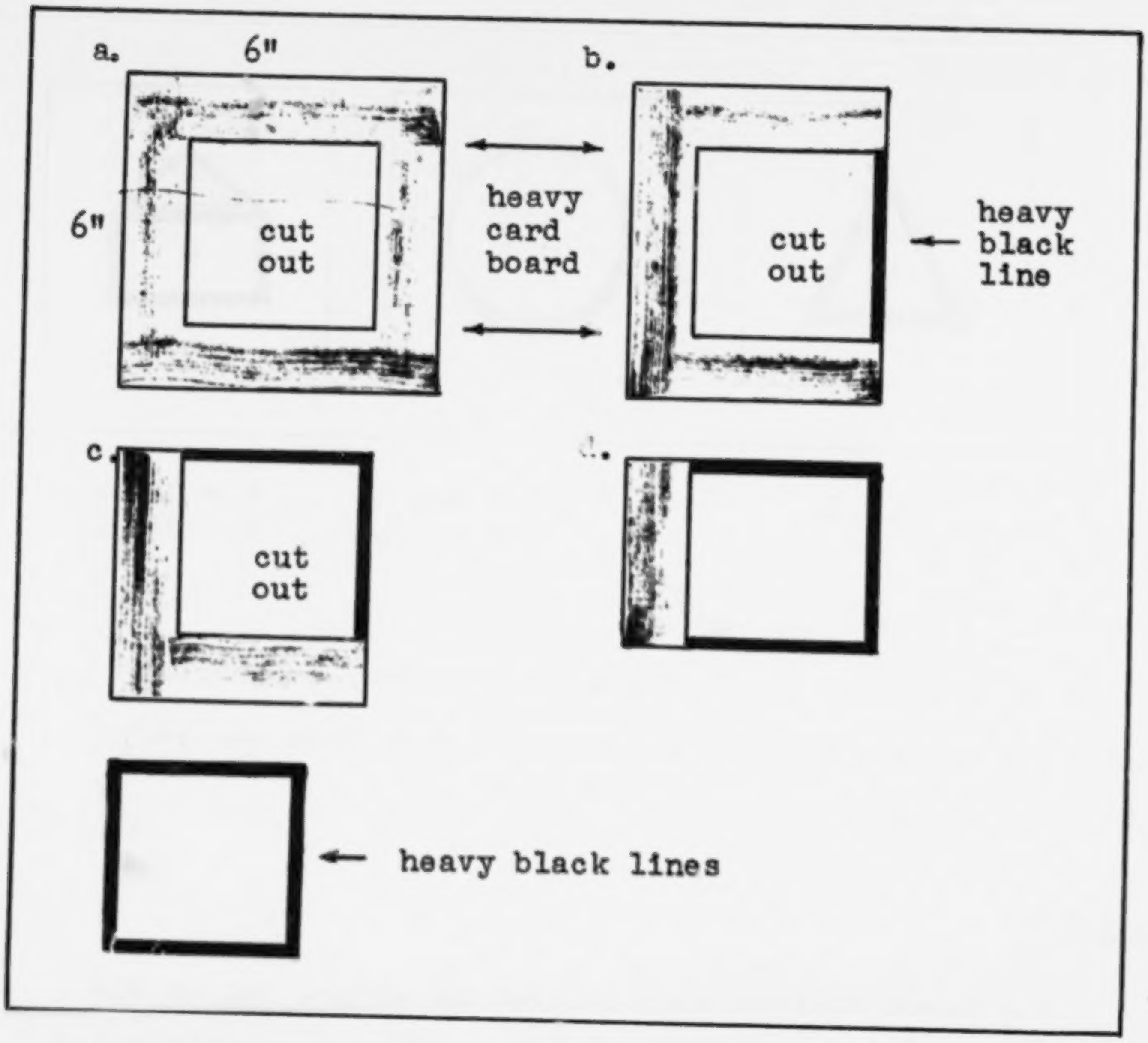

a.
6"
6"
cut out
heavy card board
b.
cut out
heavy black line
c.
cut out
d.
heavy black lines

Fig. 18.

Remove the top strip, making an ∟ -shaped stencil, and substitute heavy lines for the missing strips.

Remove the bottom strip, leaving only the strip along the left side, and again draw heavy lines to finish the square.

Now use only heavy lines to guide the child.

Draw a variety of forms, using heavy guide lines, and have the child color them (see Figure 19). Progress gradually to more difficult designs.

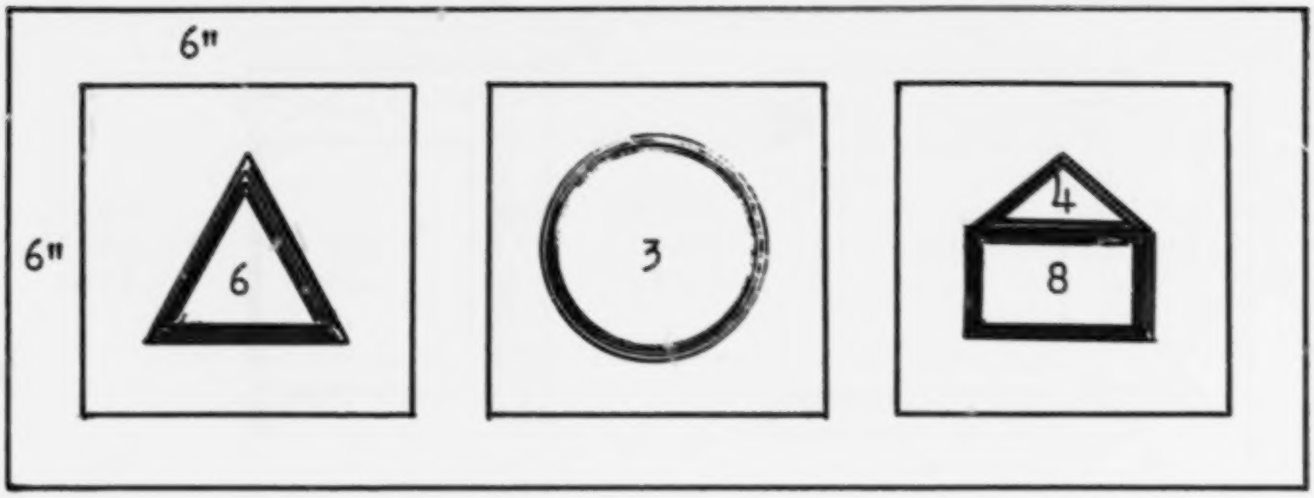


Fig. 19.

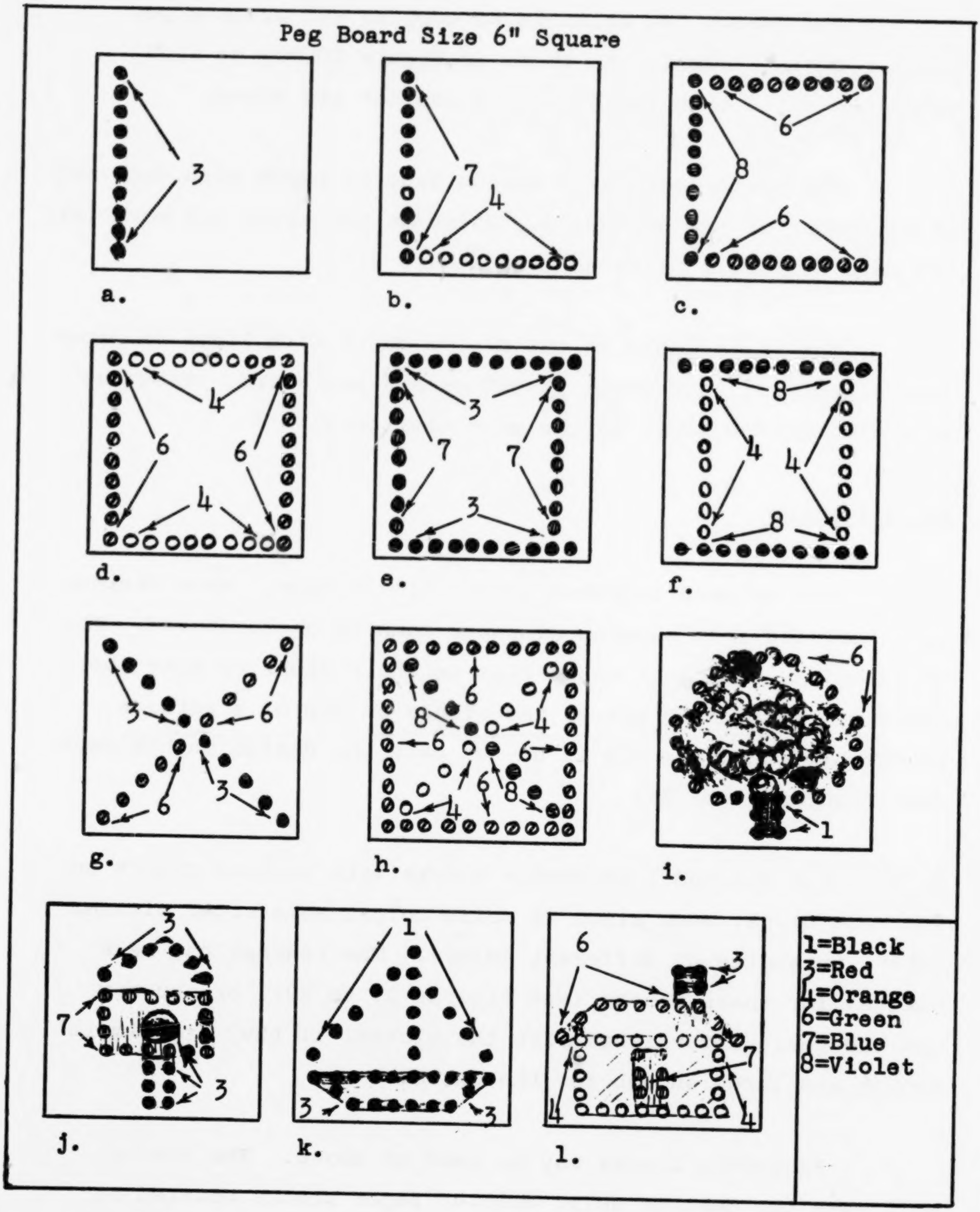
3 = Red
4 = Orange
6 = Green
8 = Violet

Let the child first trace, then color, commercial stencils of animals, birds, and so on. Work from the very simplest to the more difficult.

Peg Boards

Peg board designs should first be worked out on the peg board itself, and then drawn on the chalkboard with solid lines. If the child cannot reproduce the design which has been drawn on the board, have him draw it on paper first. Observe how he draws the design. Does he see it correctly? In Figure 20-g, for example, does he see an ✕ , or a ¤ ? Watch for clues in seeing problems.

Colored designs are made on paper and Scotch-taped to the peg board. The holes must not only be punched through, but be large enough that the child can put the peg into the opening. These, too, progress from the very simplest to the more difficult (see Figure 20).



Peg Board Size 6" Square

3
7
4
6
8
6
4
6
6
4
3
7
7
3
8
4
4
8
3
6
6
3
6
8
6
4
6
6
6
8
4
6
1
3
7
3
1
3
3
6
3
7
4
4
a.
b.
c.
d.
e.
f.
g.
h.
i.
j.
k.
l.
1=Black
3=Red
4=Orange
6=Green
7=Blue
8=Violet

Fig. 20.

The design the child is to copy is set up on a peg board. Designs similar to those in Figure 20 may be used, which the child then reproduces on another peg board.

The child looks at a design made on paper with dots and works it out on his peg board. Start at his level and work into the more difficult patterns (see Figure 21).

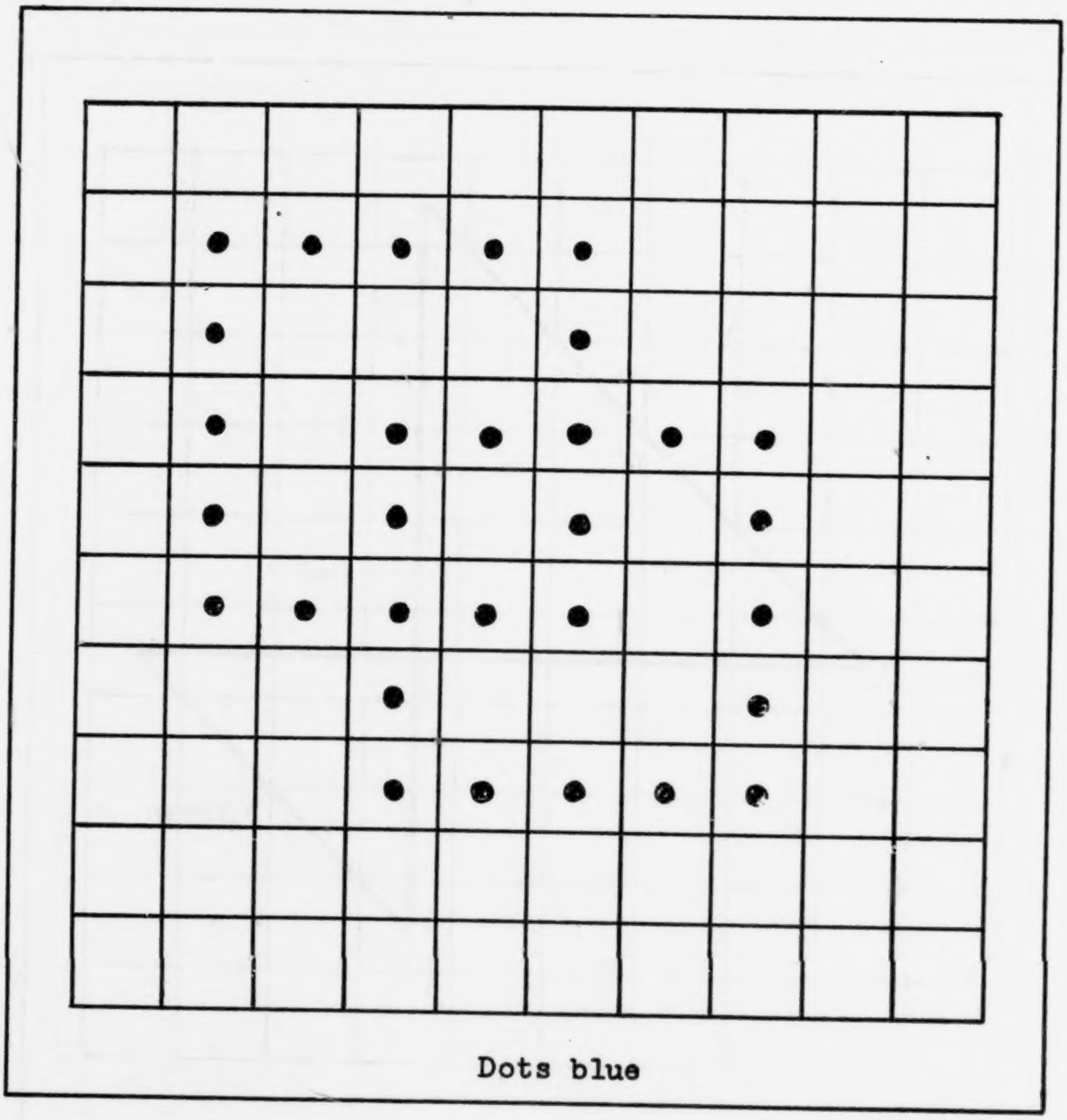
The child looks at the design drawn with lines on paper (see Figure 22), and works it out on his peg board. Progress from the child's level to the more difficult.

Block Designs

Use colored 1-inch-cube counting blocks. Make designs using colored inch squares of paper mounted on cardboard. The children use the block cubes flat on their desks to make the designs. If a child places the blocks on top of a pattern, praise him; then ask him if he can make the design on his desk (see Figures 23 to 26).

Use colored 1-inch-cube blocks with various colors on the same block, some sides in solid color, some sides divided into 2 triangles of different colors. The teacher can make designs for these blocks (see Figures 27 to 29), or she may use the designs furnished with the blocks, if they are simple enough and large enough for the child.

Parquetry blocks may be used as above. The teacher will make the designs using colored paper blocks mounted on cardboard.



Dots blue

Fig. 21.

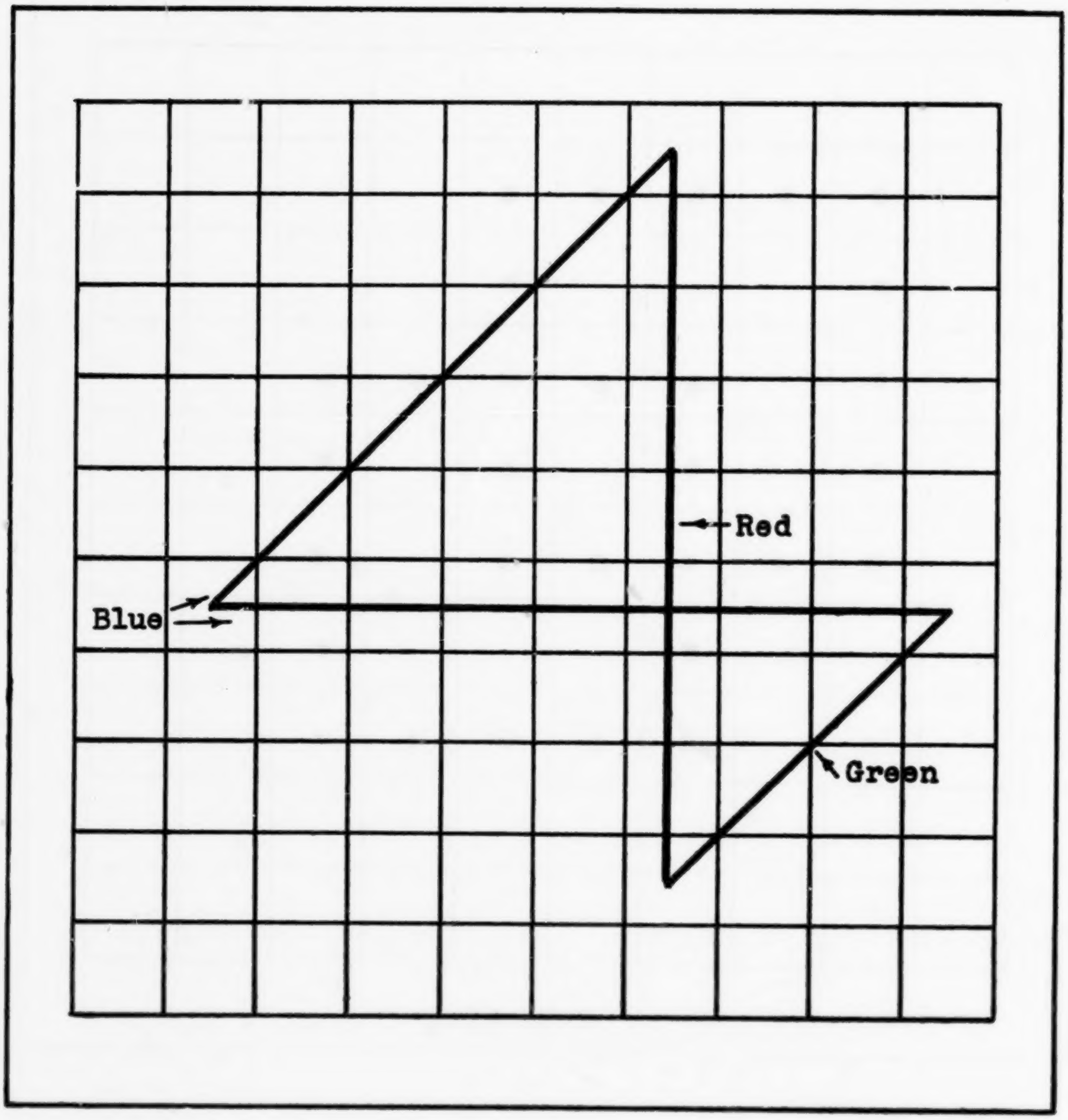

Red
Blue
Green

Fig. 22.

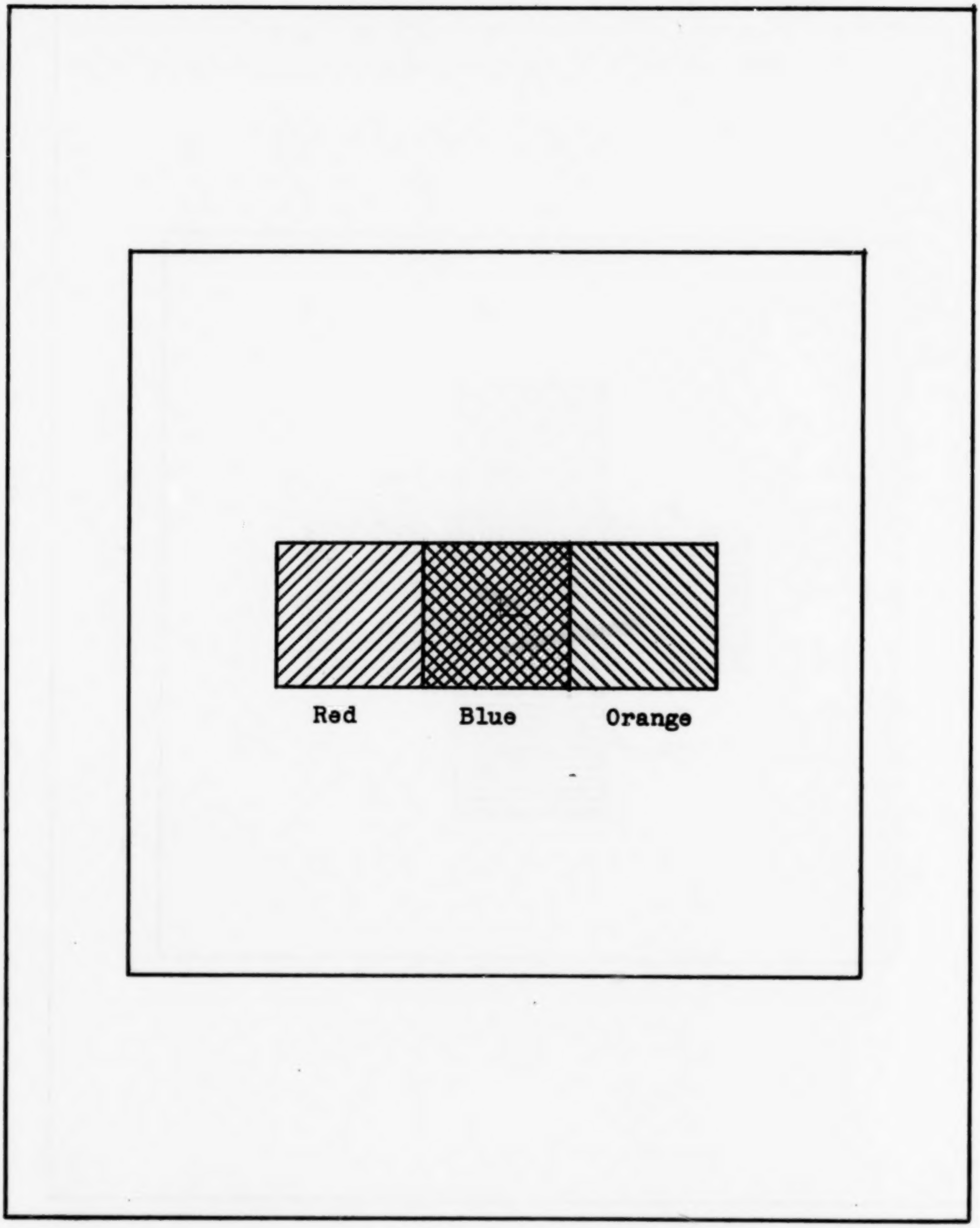

Red
Blue
Orange

Fig. 23.

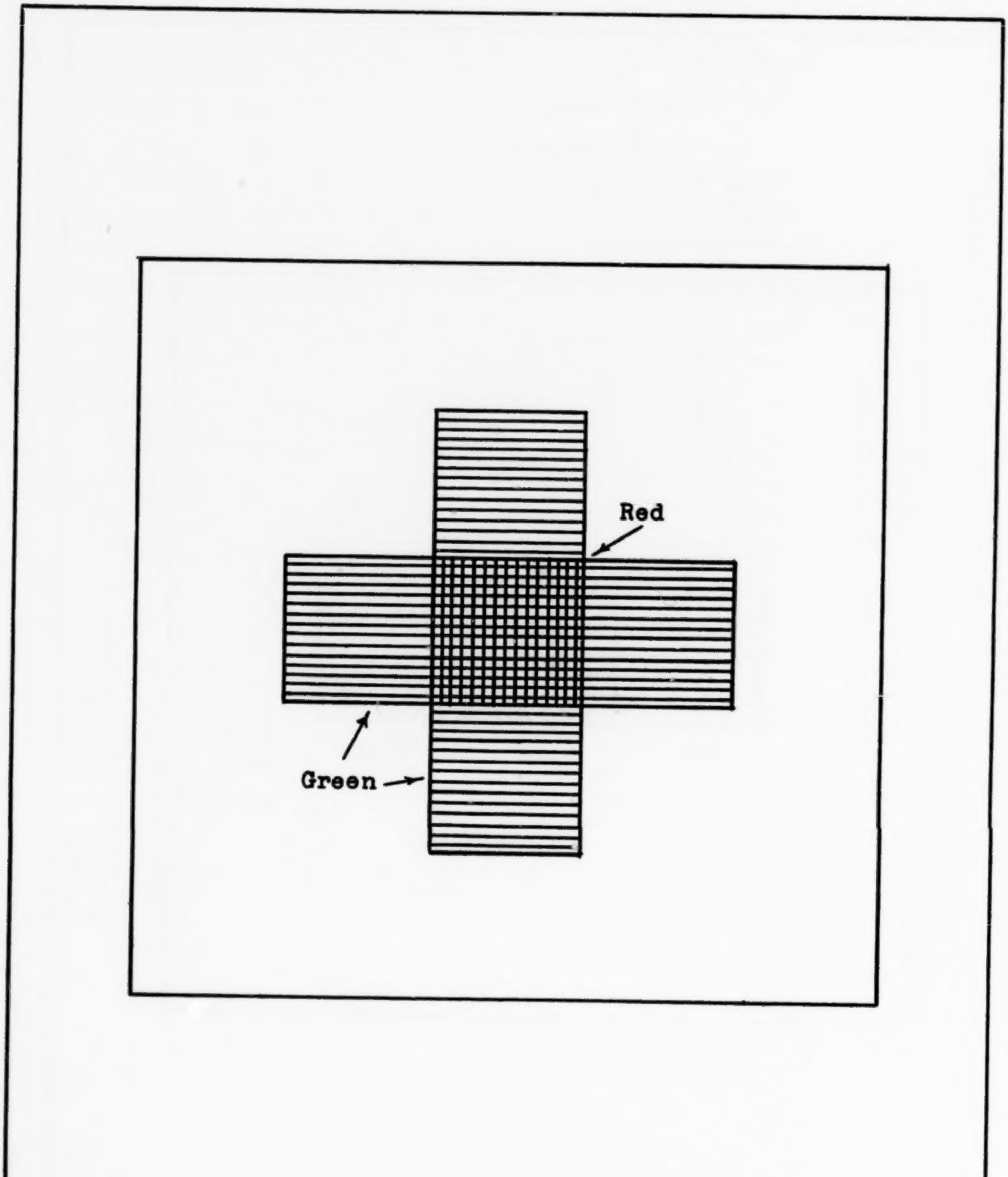
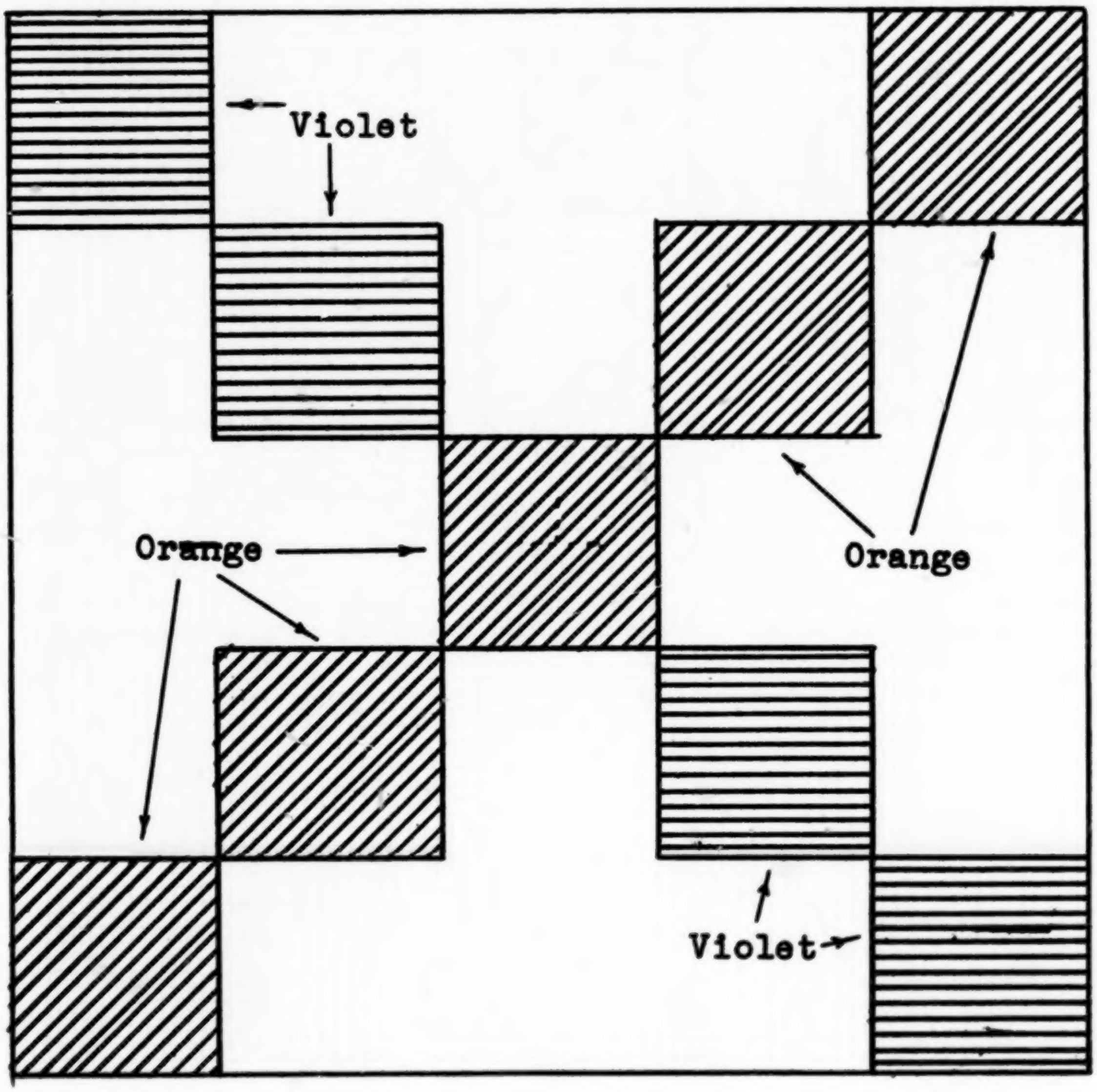


Fig. 24


Violet
Orange
Orange
Violet

This is a difficult design.

Make many of these.

Try to fit them to the children's needs.

Fig. 25.

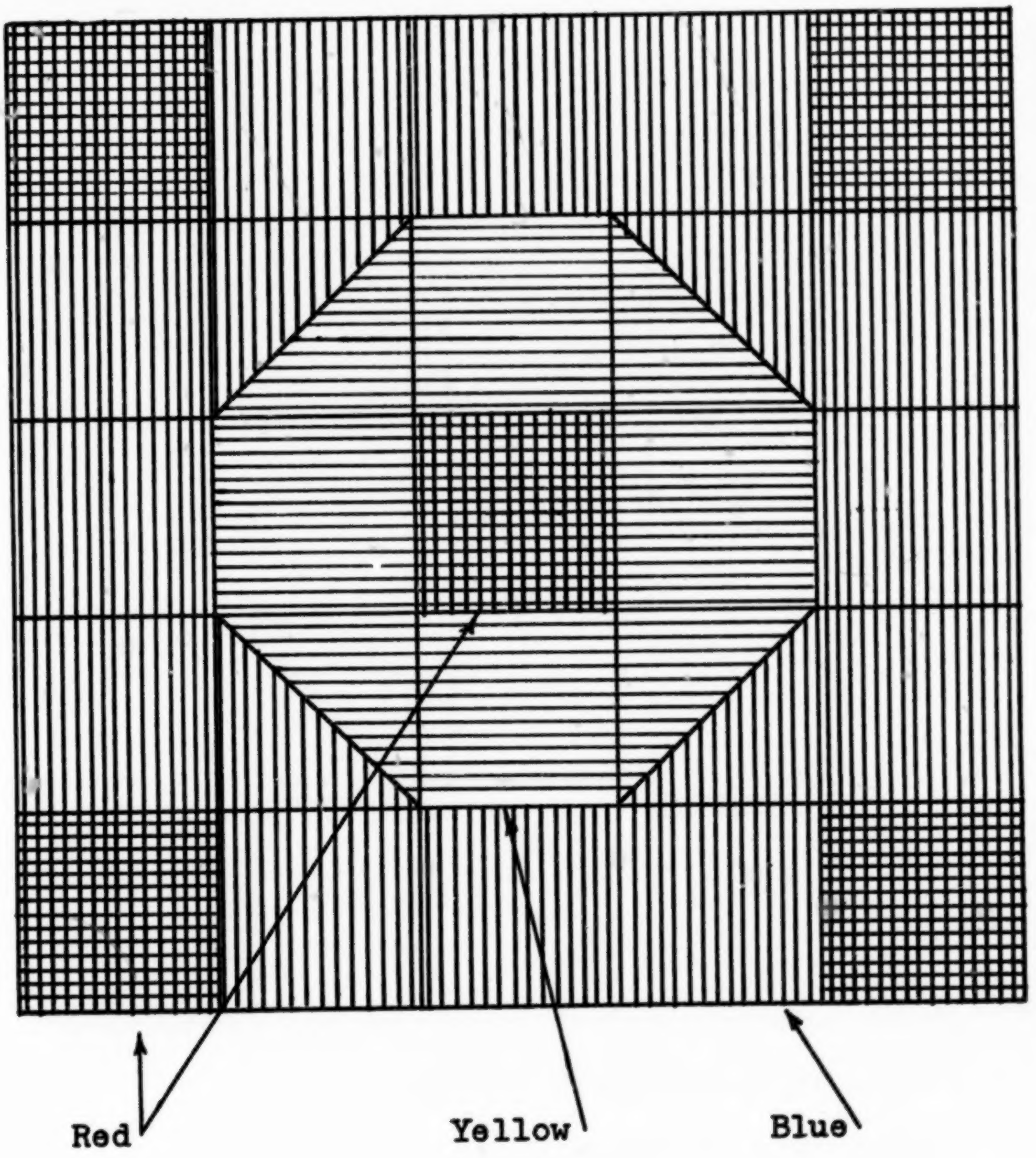

Red
Yellow
Blue

Fig. 26.

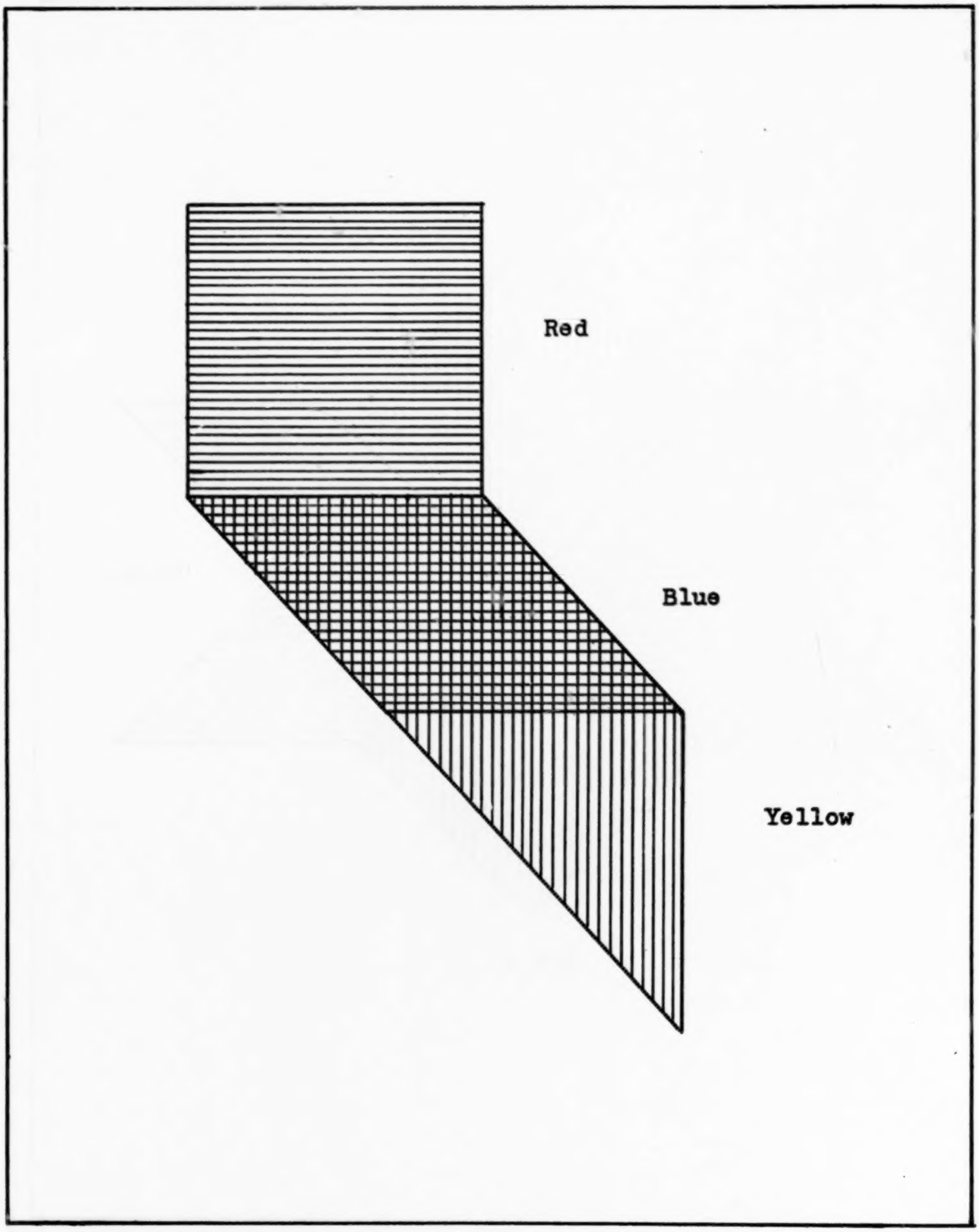

Red
Blue
Yellow

Fig. 27.

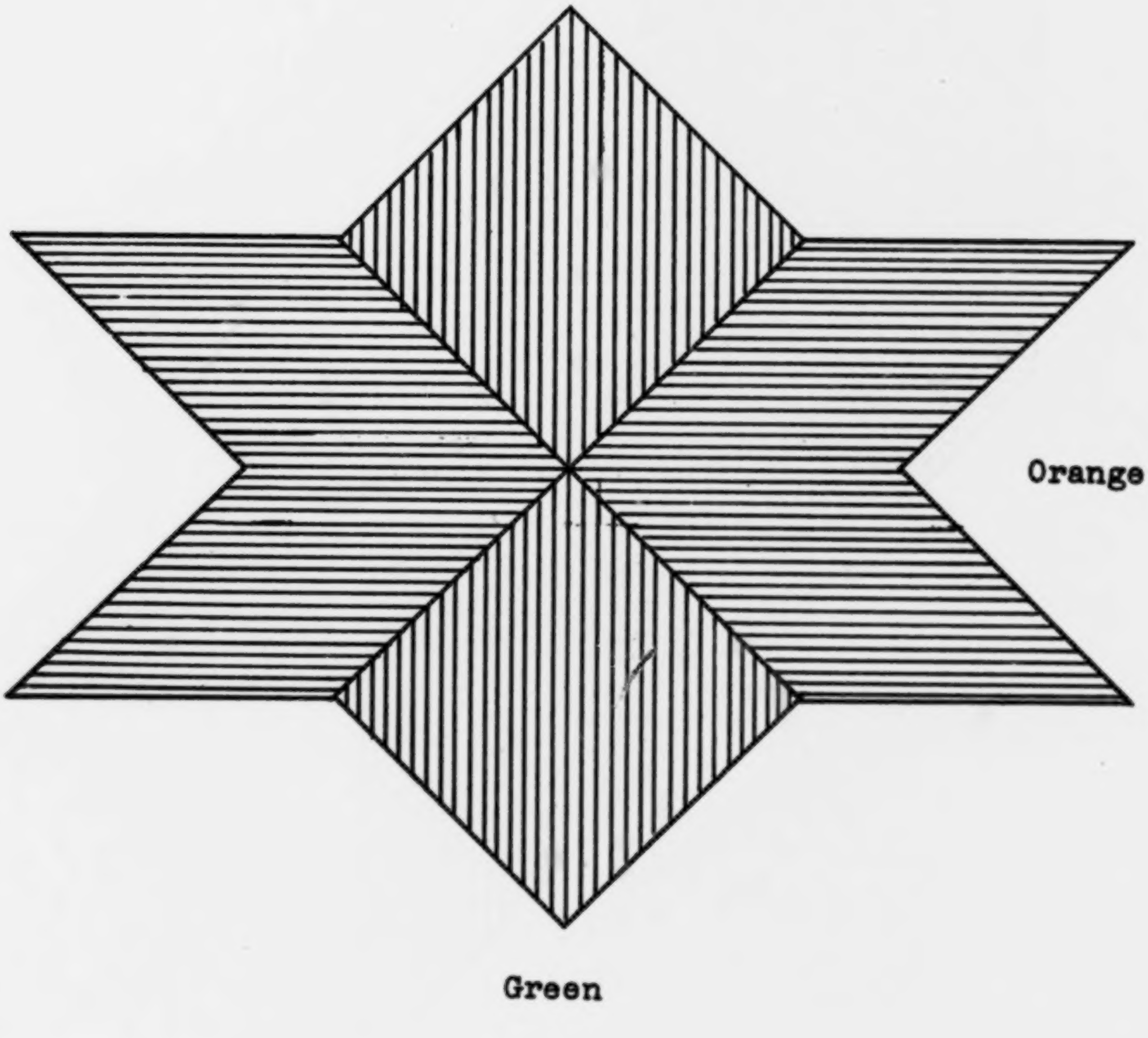

Orange
Green

Fig. 28.

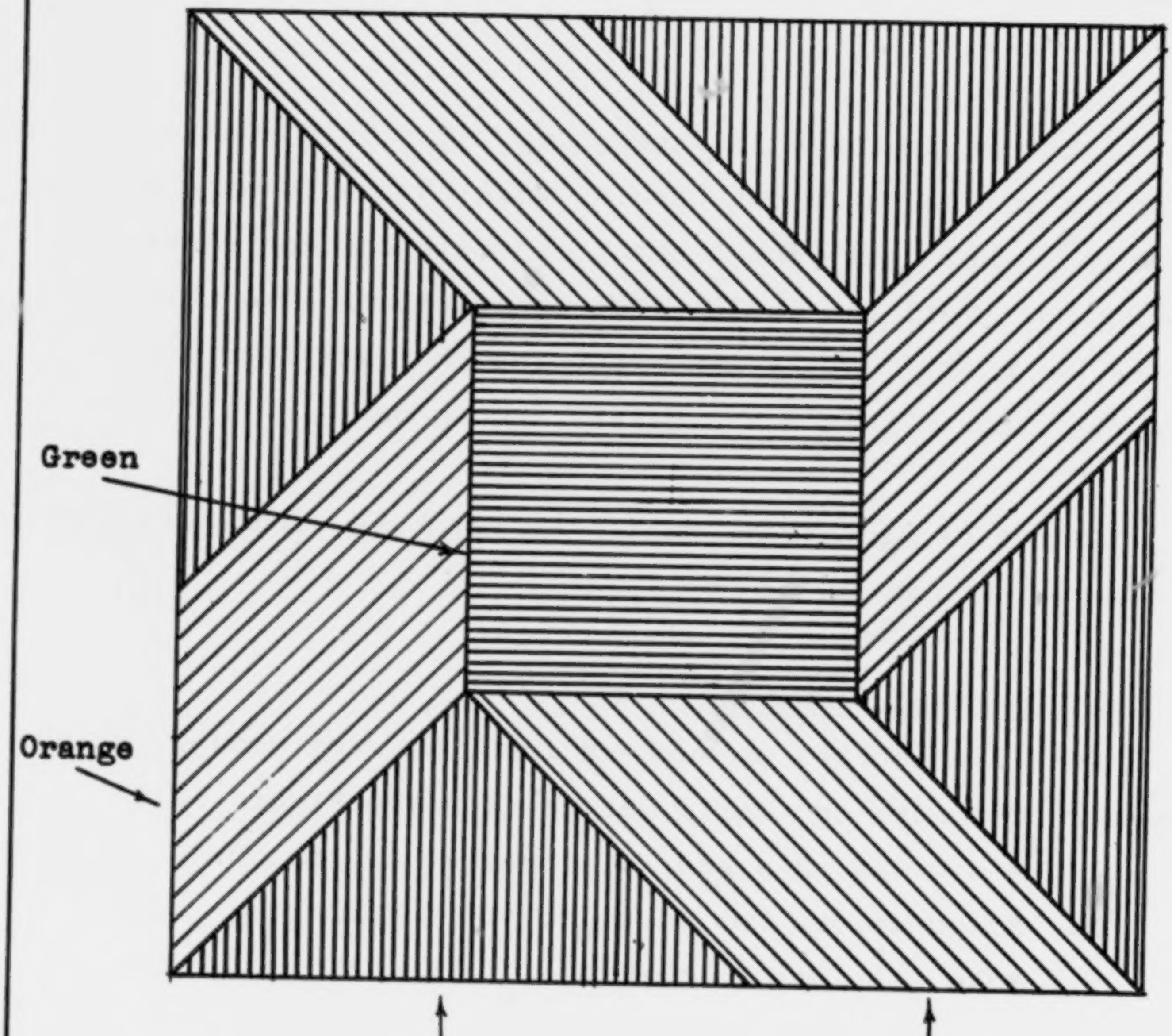

Green
Orange
Yellow
Violet

Fig. 29.

Use colored 1-inch-cube counting blocks in building upright designs from patterns drawn on cardboard by the teacher, the drawings to be 1) first in color, 2) then in black and white (see Figures 30 and 31).

Sorting and Matching

Pictures

Put like pictures in same group. Use only as many groups of pictures as the child can handle, working toward more groups of pictures. Use desk pocket chart or small box for sorting and matching. Tell the child, "Put the pictures like this in that row (or box)." Start with pictures that are identical, then with pictures that are similar, and so on.

Source of pictures-- "Match Me" picture cards, reading readiness workbooks, and so on.

Letters and numbers

Put like letters or numbers into the same groups, using the number of groups the child can handle (see Figure 32).

1. A's green, B's red, C's orange, and so on.
2. Mixed colors for each letter or number.
3. Make all letters black.

After Image and Recall

Show the child a card made in color, such as seen in Figures 33-a and 33-b. Cover the card. Have him reproduce

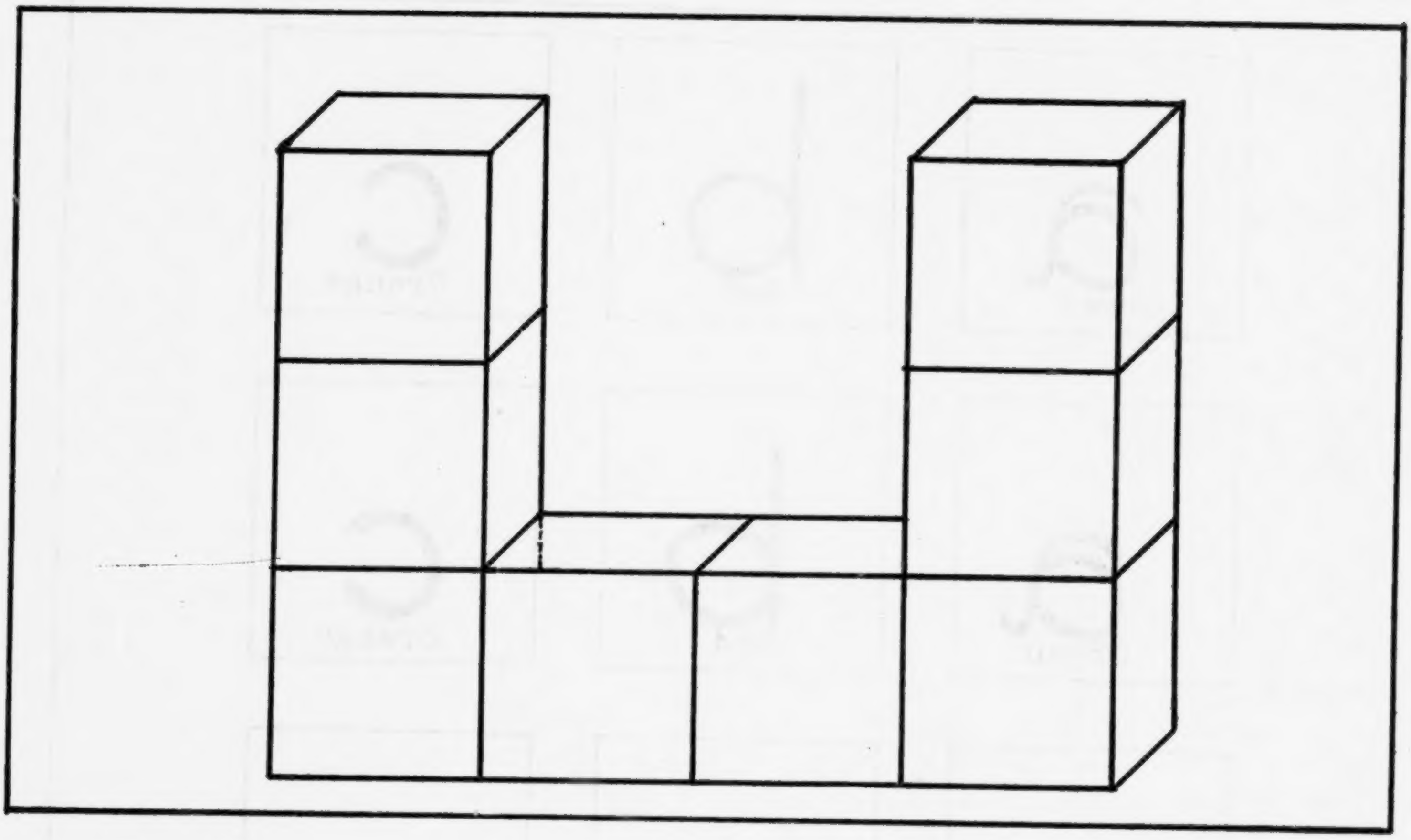


Fig. 30

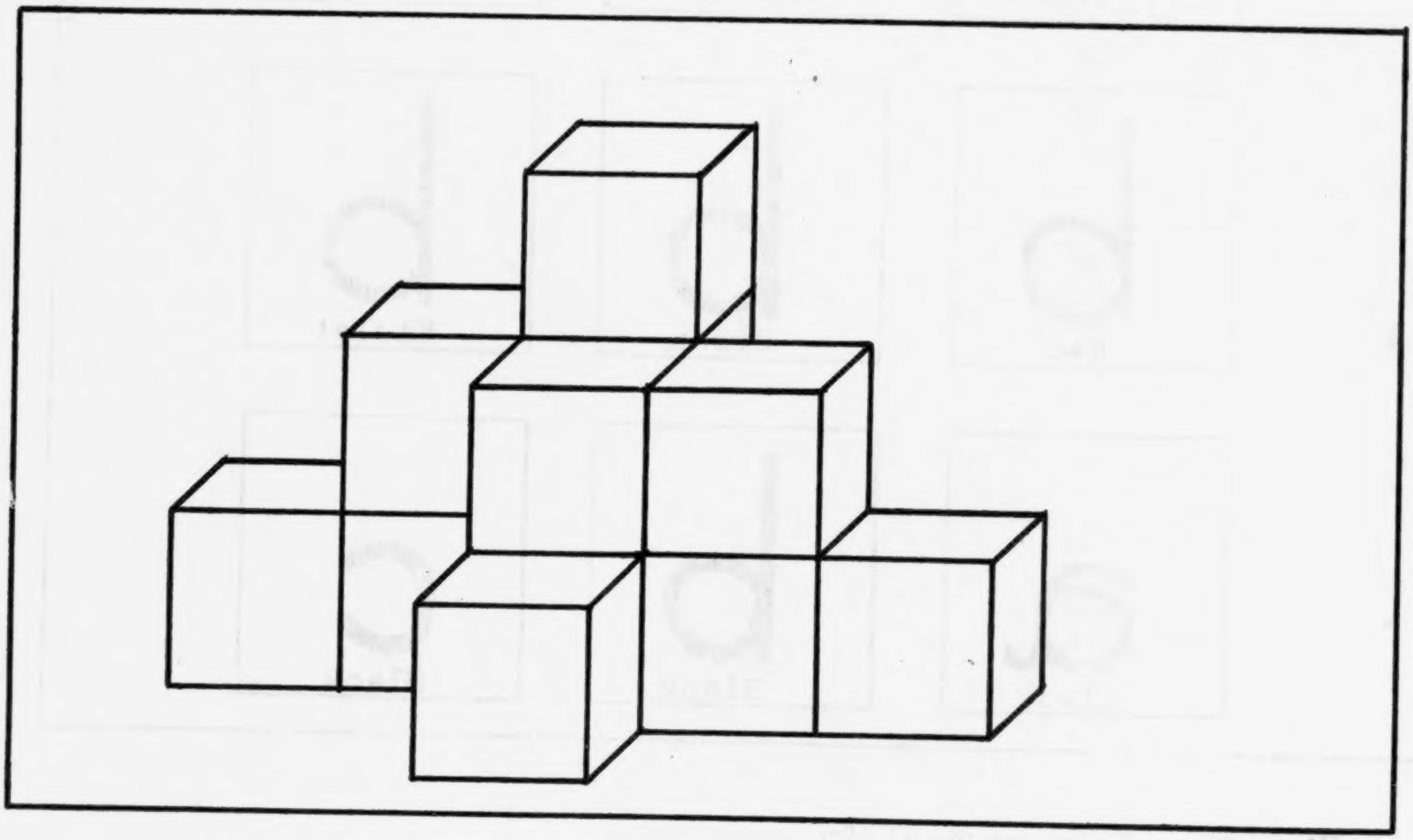


Fig. 31.

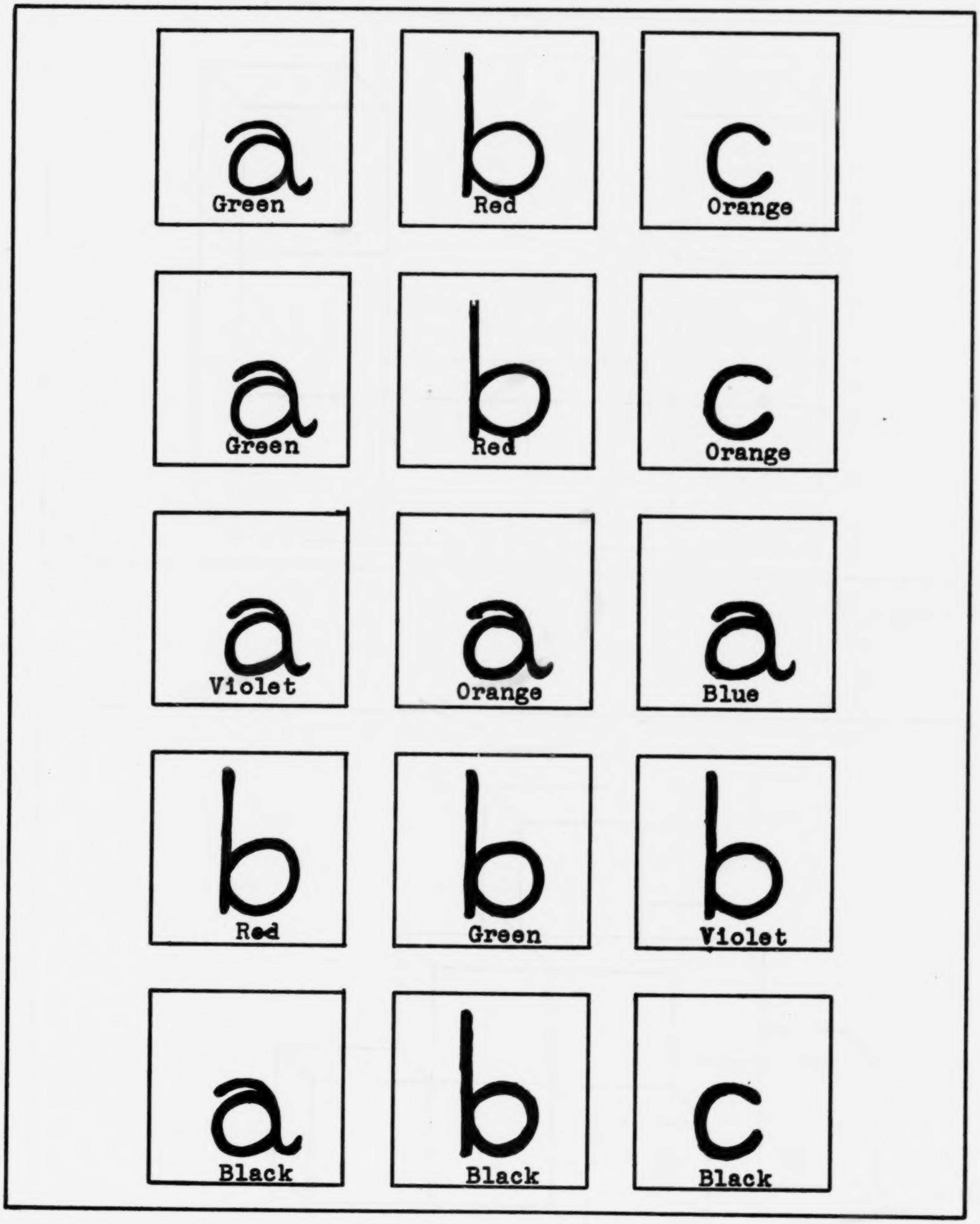

a
Green
b
Red
c
Orange
a
Green
b
Red
c
Orange
a
Violet
a
Orange
a
Blue
b
Red
b
Green
b
Violet
a
Black
b
Black
c
Black

Fig. 32. Make several in each set.

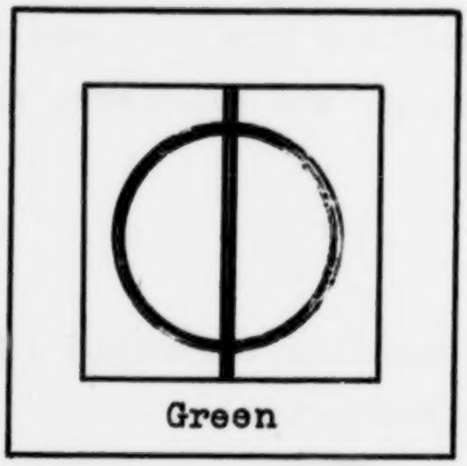
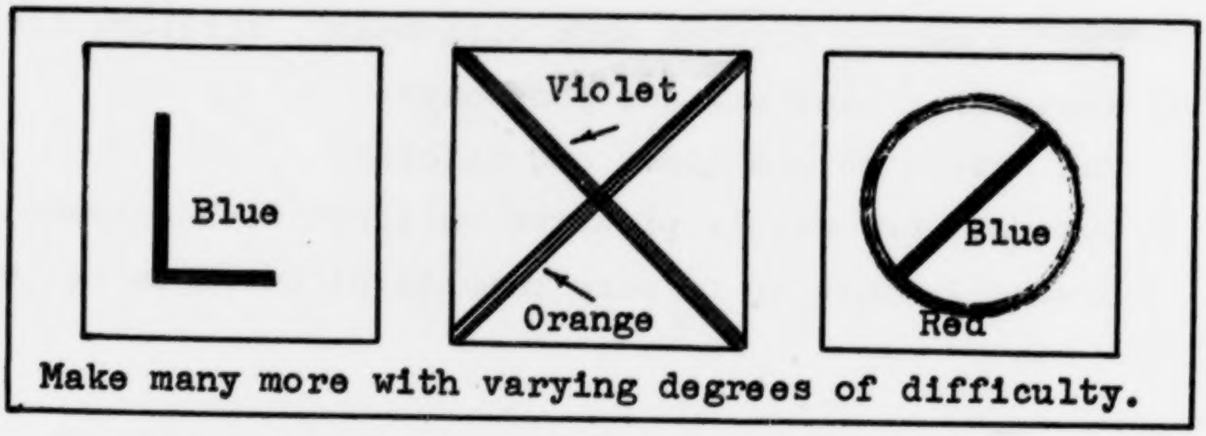


Fig. 33-a.

the design on his own blank card. The order of difficulty might be as follows:



Make many more with varying degrees of difficulty.

Fig. 33-b.

The following game is another way to help develop recall: Show the child 3 objects. Have him identify them, then turn his back. Remove 1 object. Now have him look again, and tell what object is missing. More objects may be added as the child can handle them.

Expose a picture out of a catalogue or magazine which contains a number of familiar objects. Cover it and have the child tell as many things as he remembers seeing.

Have a child look at one of his classmates. Then have him turn his back. Now have him tell you the color of shirt the classmate was wearing, and trousers, and so on.

Cutting

Cutting helps develop the child's ability to coordinate eyes and hands more effectively.

Cut on a heavy, straight line between 2 pieces of cardboard--not too thick.

Cut on a heavy, straight line using 1 piece of cardboard as a guide.

Cut on a heavy, straight line using no cardboard for a guide.

Cut geometric figures made with heavy, straight lines, such as squares, triangles, and rhomboids.

Cut heavy, curved lines and circles.

Cut out very simple pictures outlined with a heavy line.

Gradually work up to more complex pictures to be cut out.

(NOTE: the pictures may be mounted on cardboard by the child. This helps him establish the foreground-background concept.)

Drawing

Have the child follow dotted lines in geometric figures and patterns (the patterns in Figure 34 are suggestions; each pattern must be on a separate sheet of paper.) Show him a

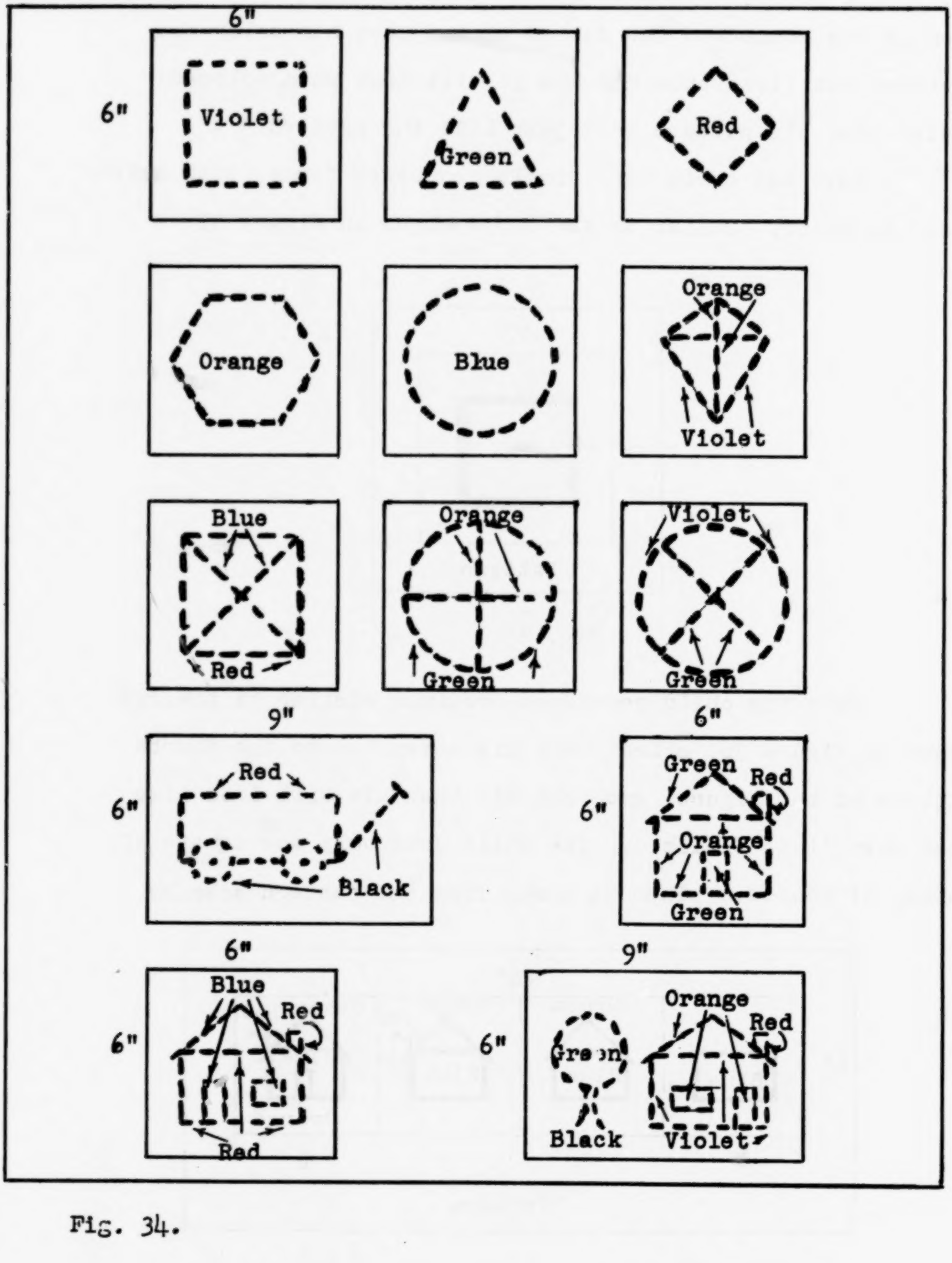

6"
6"
Violet
Green
Red
Orange
Blue
Orange
Violet
Blue
Red
Orange
Green
Violet
Green
9"
6"
Red
Black
6"
Green
Red
Orange
Green
6"
9"
6"
Blue
Red
Red
6"
Orange
Red
Green
Black
Violet

Fig. 34.

finished pattern, with dots connected, before he starts his own. When he has connected the dotted lines, have him color the picture; but first show him how it will look when colored. Insist that his picture look just like the pattern.

Have the child copy simple geometric forms, with solid lines in color, similar to the forms shown in Figure 35.

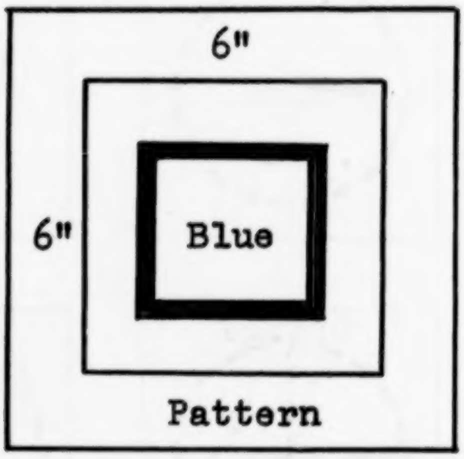

6"
6"
Blue
Pattern

Fig. 35

Have the child reproduce drawings similar to the one shown in Figure 36. First call his attention to the fourth picture of the figure, and tell him that his will look like that when it is finished. The child uses only one square of paper, of course. Then he works from the pattern step by

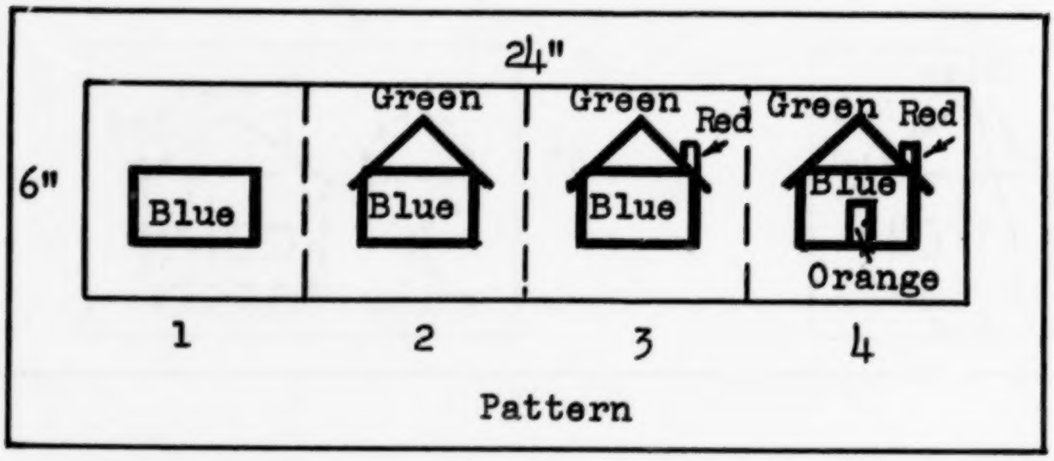

24"
6"
Blue
Green
Blue
Green
Red
Blue
Green
Red
Blue
Orange
1
2
3
4
Pattern

Fig. 36.

step, the teacher directing the procedure.

The Instructional Program

Part III, Hearing and Distinguishing Sounds

Hearing and distinguishing between sounds is a frequent problem. It may be that the child cannot identify a bell ringing, a train whistling, or water running. He may not be able to listen and follow directions, or understand what is said to him. It was pointed out that this is not likely to be caused by a defect in the auditory mechanism, per se, but it does indicate that the child needs definite help in developing the listening abilities.

The auditory training of these children will necessarily become part of the adily program. It is obvious that the child needs guidance in what to listen for and how to listen for it. The following suggestions will prove useful, but the teacher will think of additional activities as the need arises. Always bear in mind that every activity must be well organized, both to be meaningful and to keep the children in hand. Good control is of paramount importance.

Listening Games

The teacher bounces a ball. The children listen without looking. Then when called on, a child tells how many times the ball was bounced. Two or 3 bounces (perhaps only 1) may be the limit for these children.

The teacher taps (2 or 3 times) a pencil on a desk. The children listen without looking, and individually give the proper number.

Provide a cup and spoon. Show them to the child, then have him turn his back. Stir in the cup, then have him tell you what you did. Tap the cup, and repeat the process; and provide other similar sounds.

Training with Sounds

Distinguishing sounds

In the room.--The children listen without looking. When called upon they identify the sound they have heard. The teacher 1) closes the door; 2) knocks on the door; 3) rings a bell; 4) blows a whistle; 5) sharpens a pencil; 6) turns on the water, and so on.

On a walk outdoors.--Have the children let you know when they hear 1) a bird singing; 2) a dog barking; 3) an automobile motor running; 4) water rippling in a stream.

Contrasting sounds

Loud or soft.--1) The teacher walks noisily, then tiptoes; 2) calls attention to a noisy situation and a quiet one (for example, a noisy game on the playground and the rest period).

Fast or slow.--1) The teacher walks rapidly, then slowly; 2) has a child walk tast, then slowly.

High and low.--1) Teacher talks in a high voice, then very low; 2) listen for sound of a whistle and a horn; 3) demonstrate high and low on piano, if possible.

Following directions

Give simple sirections, such as 1) come here; 2) shut the door; 3) look up; 4) look down, and so on.

Increase the complexity of the directions as the child can handle them. The next step might include 2 directions, the teacher saying, "I am going to give you 2 things to do. Listen carefully. One, go sit in your seat; and two, put your head on your desk."

Hearing through poetry

Read poetry to the children for sheer enjoyment. As an aid to good listening, the children may pick out the rhyming words.

With favorites, read frequently. Stop and let the children fill in last word in rhyme.

Listening skills through stories

Read the children a story. Tell them, before starting, that they will be asked some questions about the story when it is finished.

Music to develop the ability to hear and distinguish sounds

Music is perhaps the first media that comes to the mind when one thinks of developing more discernment in hearing and distinguishing sounds. However, great care must be exercised in using music or the children will become overstimulated. If any part of the music program does cause the children to become excited, discontinue its use until you feel the group can handle it. Learning self-control is of prime importance. Music should not be used in the early days of class organizations, but only after the teacher has carefully evaluated the tolerance of the children to these stimuli.

Steps in using music.--In the beginning quiet music might be played during the rest period when everyone is already in his place. The teacher will need to evaluate the effectiveness of this music, for some children it may prove to be a stimulus which they are unable to accept.

Have the children learn My Country "Tis of Thee. Be sure of the pronunciation of the words. Establish meaning insofar as possible. Listen for rhyming words.

Later the children may gather in a group to listen to a musical story such as Mary Had A Little Lamb. As the children to find out why the lamb loved Mary so.

Teach loud and soft through music. A record player could be used here. Play first a loud selection, such as a march. Then play a soft selection, such as a lullaby. Use short selections. You may need to use many variations of the above. Songs can be used to teach loud and soft. A good song is "Clocks and Watches," from Music In Our Town, Silver Burdette.

Use songs in which familiar sounds are imitated, such as transportation songs--(The Train is Coming Down the Track), animal imitations--(Old MacDonald Had A Farm), and others. Don't use these if they are too stimulating, but by midterm the children may be able to handle them. If they can, this type of song adds interest and variety as well as helping the children to hear with more meaning.

Use songs to establish high and low. The Pussy Willow Song is a good example. Use only hands to show going up and down until the children are stable enough to use their bodies. This may not be for several months. And change "Scat" on the end of the song to "Meow" to hold down excitement.

Rhythms may be used to develop a feeling for fast and slow. The children may listen to marching music and running music. Later they may beat time to each selection with their two forefingers. Still later they may clap. Show them how to clap noiselessly, otherwise, discontinue clapping. And much, much, later they may be able to move about the room on tiptoe. Keep body activity down until the group can be controlled in this situation. Introduce it very slowly. The other rhythms (skipping, galloping, and so on) can be presented in much the same way. However, these may not be introduced at all the first year.

Music has great potential, much more inclusive than teaching only sound discrimination. It can provide individual therapy if handled skillfully. It can promote relaxation. And it provides an ever broadening field of recreation for the child as he grows in his feeling for it. On the other hand, music can be a detriment to learning in some children if they are not ready for it. Music, of necessity, must be a group activity. Some children are not ready for group experiment.

Even if a child is not a part of a music activity group, the child cannot avoid the sound stimuli produced by others and tension may result. It is with this reason in mind that the utilization of all music must be approached cautiously.

The Instructional Program

Part IV, Touch and Smell

Developing the Sense of Touch

The sense of touch is frequently underdeveloped in these children. If it is, this is a serious handicap, because developmentally the tactual percept precedes the visual percept.

How does the teacher determine if the child does need help in this area? Does he know the feel of solt and hard, smooth and rough, smooth and sticky; of cotton, fur, velvet, leather, wood, metal? If not, then the teacher looks for ways to help him. Following are some suggestions:

Give him a hard block and a wad of cotton (familiar objects). He feels and sees the difference at the same time he says "hard," "soft." It may be necessary to introduce one at a time.

Make up games and riddles with objects. Put objects in view. The child picks up all the: hard objects; soft objects; rough objects; smooth objects, and so on.

The child closes his eyes and feels something, then gives the correct description of it, as, "It is hard."

The teacher says, "I am thinking of something hard. It is in this room. What is it?"

The child who guesses correctly becomes the leader. See to it that everyone gets a turn.

"Let's name 3 (or 2, or 1)" hard things; soft things; sticky things; furry things, and so on.

Blocks and objects may be identified through touch. Put 2 or 3 differently shaped blocks on a desk. Let the child feel them, look at them, identify them. Now put them inside the desk. The child feels them without looking at them.

1. He names the shapes.
2. He draws the shapes.

Use objects the same way--drawing only if they are not too difficult for him.

Paste different shapes made of felt on cardboard.

1. The child feels and names one with his eyes open.
2. The child feels and names the same one with his eyes closed.
3. Omit step "1" as soon as possible. Increase the number of objects slowly.

Flannel board--Use same procedure as in pasting felt shapes on cardboard.

Raised figures, numbers and letters--First, cut 3 by 3 inch cards. On each card make a number or a letter with Elmer's glue. Sprinkle with sand and let it dry. Let a child feel a letter or a number without looking at it. Can he tell what it is? If not, let him look at it. Then tell its name.

Next, use a stencil of an animal, or food, or an object. Shellac inside the stencil. Sprinkle with sand and poster paint. When it dries have the child feel it, look at it, if necessary, and name it. Have him name it without looking as soon as possible.

Developing the Sense of Smell

Learn to identify familiar foods such as bananas, apples, chocolate, peanut butter, and so on.

Circumstances can dictate when recognition of odor should be developed.

If there is a cafeteria in the building, let the child guess what is cooking.

It is a matter of safety to be able to identify the odor of gas, smoke, gasoline, and so on. The family can be asked to help in this situation.

Awareness of the odor of flowers, weather, and so on, all serve to heighten perception.

Motor Training

Discovering Child's Need for Motor Training

The characteristics of the children under consideration here have been outlined in earlier sections of this monograph. They include the following: little apparent physical malformation, but considerable lack of physical control; emotional involvement as a result of repeated failures to achieve, and striking patterns of misbehavior; and wide gaps in developmental patterns. The gaps may result in infantile behavior in a seven-year-old; in the inability to hop, climb, or run; or in difficulty with "normal" activities such as moving the eyes independently of the head, or pointing in a given direction.

How can the teacher know where these gaps occur? Obviously she cannot study completely each child's developmental pattern. But she can gain insights into a particular child's problems by observing from three points of view.

She will watch closely the physical behavior of each child. She will be alert in standard situations in the classroom, notice which child is likely to bump into desks, drop papers, or move with less than normal gracefulness. She will discover the type of situation the child finds difficult, and how often this occurs. One of her richest sources of information will be the free play period, both indoors and on the playground, for this is the time when the child is most himself. What he does, how well or how poorly he does it, and with whom--these facts will tell her a great deal about how old he really is.

She will get clues from his parents. She can gather information about how far he has progressed in caring for himself. She can learn revealing facts about the progress he has made in dressing or bathing himself, and in the care he takes of his possessions. She can find out about his play habits, and what he does "for fun" at home.

She will look for answers to specific questions. Can he tie his shoes? Can he catch, throw, and kick a ball? Can he open a door by turning the doorknob (one of the children in these groups could not)? Can he climb, hop, skip, jump, and run easily? Can he sort objects? Continuing observation in these areas will supply the teacher with additional valuable clues to gaps in the child's development.

Perhaps no aspect of the job gives more strongly than does this one the feeling of exploring in uncharted territory. It may be observed with great frequency that, in general, the children most lacking in elementary physical skills are also the children most handicapped in reading, writing, and arithmetic. As physical skills improve, children relax and seem more competent in academic areas as well.

It is impossible to say to what extent this improvement is due to motor training rather than to other aspects of the learning process. Large blocks of time may be devoted to physical activities (larger than is usual for these age groups: 7 to 9 years); but this seems to bring forth less fatigue and more sustained interest in purely academic periods.

Considerable variation in this activity may be expected from one class to another; half an hour daily (in addition to playtime and other physical activities) is the most usual amount. Since the skills required in academic subjects demand intense effort from the children, it follows that frequent changes of activity are helpful. Short periods of time devoted to the activities to be described below can thus be made to serve a double purpose. The degree of interest and enthusiasm which children usually show for these activities seem to indicate that they are enjoyed not only as breaks in the routine, but also because they introduce skills which the children are eager to learn. In making up a list of large and small muscle activities to meet the needs of a particular child or group, a most useful resource book is that by Prudden (4).

It may also be possible to ask the help of the physical education instructor in working out some parts of the program. A word of warning is in order here. Since the regular physical education program will be planned in terms of chronological ages, the instructor in that program must know the mental and physical age level represented by the special group or child. Probably the teacher can do this best by indicating the motor skills she hopes to develop. She will want games that require only the number and kind of actions that she feels sure her group can carry out without confusion and excitement; actions that call for only the number and complexity of instructions that the children can readily understand.

It is of paramount importance to note that the program of physical activity will not begin until after all of the children have made a successful adjustment to the structured daily program and have begun to evidence a degree of success in school achievement.

Planning a Program for Large Muscle Activity

The teacher's first care in planning for large muscle training is to introduce situations which provide for movement without excitement. *Excitement arises when the children do not* know exactly what to do. It is important to organize each activity so that:

1. Each child knows from brief, simple directions, where he is to be at each moment, how to get there, what to do, and how to get back.
2. Neither the skill needed in the activity, nor the amount of waiting for his turn is beyond his capacity.
3. The amount of stimulation from noise, movement, laughter, and so on, is kept within the endurance of the less stable members of the group.
4. Range of levels will be wide. It will be important to adjust activities to skill variations where possible.

The activities listed here are arranged roughly in order of the extent to which they meet these requirements.

Outdoors

Pre-Kick-Ball

Players form a line and take turns kicking to the pitcher. This is probably plenty to start with. When the group is able, add the step of running to a base, then two, then three. How many days it will take to move into Kick-Ball depends a good deal on how soon there are enough catchers to do the necessary minimum of fielding.

Catch-Ball: Roll Ball

Same as above but the players catch the kick ball instead of kicking, and throw it back to the pitcher. In

Roll Ball they roll it.

Track Meet

Children run around the black top, or playground as many times as seems to fit each child. All can run together, but this is not a race. Competition means only trouble for most of the children. Particularly at first, it is important to eliminate it in every way possible. Hopping, skipping, jumping, running with arms outspread, and so on, can vary the activity.

Jungle Gym or Bars

The children play tag in and around the jungle gym. This keeps the game within a limited area so that more people are tagged, and encourages climbing.

Call Ball

Each play has a number. One in the middle calls a number and he throws the ball in the air, and the child who has the number tries to catch it.

London Bridge, Duck, Goose, Red Rover, Ring Around a-Rosie

These are other familiar games involve valuable practice in coordination for this group.

1 - 2 - 3

Players in a circle are numbered one to three. The teacher (until a child can do it) calls "All the one's run" (or two's or three's). All with the number called must try to run around the circle and back to place before another child who is "it" can catch them.

Relays

These can be done sooner outdoor than in. Walking, hopping, skipping can replace running. Farmer and Crows may be possible late in the year. First children in line are the farmer, who "plants seed" (four counters) about 10 feet in front of the lines. Next ones are crows who eat it up, i.e., pick them up and return them one at a time to the third children who replant them, and so on till the first children are back in front. Make sure in playing a second round that places are moved to give each child a turn at each activity.

Indoors

Following directions

Children sit at own desks and take turns carrying out some action command - hop, skip, jump, place arms, legs, torso, and so on, in various positions. This is a good way for the teacher to find out what skills she needs to teach.

Calisthenics

Records are helpful in this. Exercises should include as wide a range of muscles as possible, not forgetting hands. Later lessons can concentrate on areas where particular work is needed. To reduce both stimulation and frustration, slow rhythms should come first. The children will tire very quickly, especially at first. Rest on mats should probably follow. Mats are also useful in keeping each child in his own place. More advanced people can do further exercises while others rest and watch.

Marching, Clapping, Walking, Skipping, Running

These activities are accompanied with motions of arms: elephant walk, duck walk, and so on, preferably to music.

Balancing

Have children walk on line or 2 by 4 inch board. (A lumber yard will make wooden supports or slots to hold the board up on its narrow edge for that step.)

Eraser Bowling

Children sit in 2 rows to form an alley down which players take turns rolling kickball to knock down 3 or 4 up-ended erasers. Teacher or child, if possible, keeps tally on board. Best score out of 2 tries gives better chance of success and reduces frustration. The distance of the roll should vary according to the skill of each player.

Chair Ball

Same formation as above. Roll the ball under 1, later 2 chairs from whatever distance is appropriate to the skill of the player. Keep score as above. Two tries as above.

Erasers in Basket

Same formation as above. Toss erasers in empty wastebasket from most feasible distance. Keep score. This game may be only for 2 or 3 more physically skilled, while the rest of the group plays something else.

Building

The children use desks, chairs, tables, and so on, to build tunnels for crawling, trains, rocket ships, and so on. This activity comes later in the year about in time for long periods of indoor weather. By this time the children have developed their own leaders and can use this as independently creative play with much opportunity for conversation and invention.

Care of room

Erasing and washing boards. Washing lunch tables or sink. (Running water is a great distraction to many of the children. Any activity which involves it needs careful control.) Picking up papers and crayons, putting chairs on to tables and down again.

Small Muscle Activity

Most of these are self-explanatory:

1. Folding
2. Cutting
3. Dealing and holding cards
4. Block building (both large and small blocks)
5. Picking up things (pegs, paper, beads)
6. Squeezing sponge ball
7. Finger and wrist activity
8. Lacing and tying
9. Winding a spool
10. Weaving
11. Tapping
12. Blow down and pick up - fold little pieces of paper, have child blow them down then pick them up.

13. Speech muscles 14. Eye exercises	For both of these give motions to imitate in "Follow Directions" or "Simon Says"

Following target with eyes without moving head, in horizontal, vertical, and oblique planes.

15. Foot exercises--Use in "Follow Directions," "Simon Says,"
    Marching
16. Eating; chewing, using tool, sorting: stacking, carrying plates, trays.

Writing

Writing as Therapy

Writing is one of the most crucial learning activities. The difficulties in motor coordination which are such a basic part of the child's problem are more evident (though not necessarily more present) here than in any other academic subject. The developmental kinesthetic approach to learning is here available as an indispensable aid to reading; the senses of touch and motion are used to help fix in the child's mind the look and sound of letters. The physical activity of writing channels his restless energy and gives him the rare experience of using that energy in a way which calls forth praise. It is perhaps for this reason that the child most often begins to take great pleasure in writing. Certainly this is an activity that often provides the experience of success which he needs to overcome his initial feelings of fear and failure; and in the process his bizarre or frustrated behavior is lessened. Indeed, a restless, unruly child often becomes a model of industrious virtue when he is presented with a specific and suitably simple writing assignment.

Writing is also an invaluable tool in helping the child to see letters and words as wholes (Gestalt) instead of as the disconnected parts in which they usually appear to him.

In reproducing the sound and shape of a letter the child concentrates every part of his physical system; eyes, large and small muscles, and (in the present therapy) vocal cords, and ears. This helps him in two ways:

1. because senses and muscles are in use he is free from the many distractions which usually pull at him from all directions;
2. because several senses unite to bring the impression to his brain, he achieves a clearer and more satisfactory result than he could obtain by the use of any one sense alone.

Principles

Cursive Writing

In view of these considerations, it may be stated that only cursive writing should be taught. In cursive the child uses a continuous flowing motion which carries him on, by its own momentum. Cursive writing helps his disorganized, uncoordinated movements to fall into a coherent pattern. Letters flow into each other, and this fact reduces the sensitivity to external distractions present in the non-continuous motions and the disconnected letters of manuscript. Further, words are written as connected wholes, and improper connections are not a problem as they often are in manuscript. For example,

Th ebo yrd nu pt hehill

The connections between letters in cursive writing also help to emphasize left-to-right progression. Cursive letters, moreover, are not subject to reversals (compare b - d and b - d). And finally, if the child is taught the new skill of cursive writing, there is no need for the teacher to correct the errors that may have developed in his wrongly formed manuscript.

If a child has already been taught manuscript, he must be led to feel that this is also a worthwhile accomplishment. This is important, for he has few achievements to take pride in. He should not be given many opportunities to use manuscript, however; he should learn that cursive is another higher step which he is now ready to understand. Manuscript may be avoided by using print sets, printed letter cards, a typewriter, and so on. A possible exception to the avoidance of manuscript might be the child on the second- or third-grade reading level, who needs to do longer assignments in answering comprehensive questions, in doing creative writing, or in spelling lists which go beyond the cursive letters he has learned so far.

Color and Sound

Two of the most dependable aids in teaching writing are the use of color and sound. Just as color is one of the first things an infant notices, and as color holds a powerful attraction for the young child, so it catches and holds the attention of the immature and hyperactive child also. By being a stronger stimuli than others in the environment, it frees him a little from external distractions. Heavy colored lines help him to see actual shapes and directions and to locate lines or strokes which have been confusing him. (See below for details on the use of color.)

The other important aid is the use of sound. The child says softly the sound--not the name--of each letter as he writes it. When he can put two or three letters together, he learns at the same time how to sound them and how to blend them into a word. At the beginning he will write only phonetic words.

Writing Readiness

Every child will probably not be ready to begin with the first steps in writing--namely, learning to form the letters. It is estremely rare to find every child at the same level of coordination and behavior--the factors upon which success depends. This fact provides another illustration of the cardinal principle that the teacher cannot work alike with every child. She watches each child, observes what he uses to help himself (color, shape, touch, and so on), as well as what he avoids, and plans her work accordingly.

A major prerequisite to the small muscle work of writing is gross muscle development. Extreme lack of skill here may be the signal for delaying all formal writing activities. Deficiency in this area is so prevalent that it should never be overlooked as a factor in writing difficulty. The section on motor training discusses how the teacher can detect and evaluate lack of motor skill, and gives measures that have proved helpful in treating it.

It is probable that some children will have to begin with certain preliminary activities; others may be able to proceed directly to the formation of letters. The clues are given by the children themselves; in general, the level of coordination and the type of behavior provide those clues and indicate the point at which each child must begin.

Insofar as coordination is concerned, the child may not be able to copy simple lines (— (/) ∪); perhaps he cannot make curved lines (his m contains jagged peaks); he cannot keep reasonably well within guide lines; he cannot cut, or cannot follow directions for simple physical activities (see the section on motor training).

As to behavior, he may lose, tear, or mark the paper; he may yawn, wriggle, play, make silly noises, or annoy other children. Obviously, misbehavior can stem from many causes. *In general, however, a child finds such pleasure in doing well a task that is within his power, that marked and* *continuous need for discipline should always be a signal for re-examining the amount and difficulty of the work he is being asked to do*. The teacher may find it well to ask herself from time to time questions such as the following:

If the child is not working well, is the work too hard? Is it so easy that it offers no challenge? Is it too familiar, and does it need to be presented in a new guise? Does the child feel humiliated because he thinks the material is babyish (even though it may be difficult for him to do)?

Sometimes understanding the purpose of the task is enough to spur the child on. At other times, ways must be found to make the work look more "grown-up."

If symptoms in either of these categories (coordination and behavior) raise doubt as to the child's readiness for conventional writing, the teacher sould draw on the following list of activities, experimenting to find the one suited to the child's needs. They may be used in addition to longer or shorter writing assignments, or as substitutes, depending upon the child.

Techniques

Large Muscle Work

Many children gain from practice in drawing within and outside of large and small cardboard shapes, thumbtacked to a board or an easel (5). Shapes which include the type of line which is causing trouble should be chosen; they may be approximately as shown below (Figure 37), and both the inside

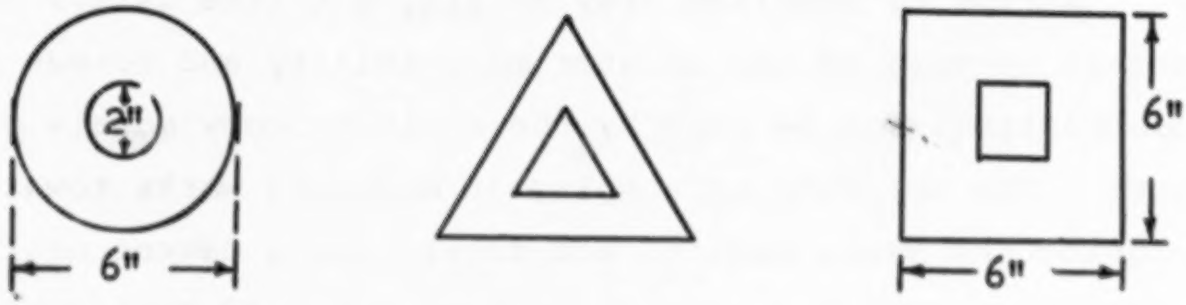


Fig. 37.

and the outside patterns should be drawn by the child. The inside pattern should be done first, so that he has something to push against. The outside pattern will prove to be more difficult, for the crayon or large pencil will tend to wander away from the pattern. Forms such as those shown here will give the child his directional lines.

A variant of this approach is one in which the child traces very large letters, figures, or shapes. The chalkboard may be used, or a large paper may be placed on the child's desk; the latter is less likely to distract the rest of the class. The ideal method is to project, with the slide attachment of a filmstrip projector, the items to be traced. Letters of pictures (pumpkins, hearts, circles, cats, and so on) which call for the type of line being developed at the time may be projected on to an easel. A sheaf of large papers may be thumbtacked to the easel, and the children may trace in turn. The teacher may find it necessary to guide the child's hand at first.

Small Muscle Work

Strips of modeling clay or Play-Doh (the latter is preferred because of its greater malleability and lesser source of distraction) may be used by the child to copy models of letters. The activity of shaping or modeling works toward developing the small muslces and developing a degree of finger coordination. Further, the child both sees and feels the letter he is working on, and comes to understand its shape more clearly.

Cutting and pasting

These will be tied to other subject areas, but should be included in generous amounts for children with writing problems.

Coloring

This is a particularly important activity. Since background-foreground disturbance is a major problem, the usual commercial coloring book is not often satisfactory. Coloring books whose pictures are simple enough, whose outlines are sharp enough, can be found. But to use the common type of coloring book, with small pictures and decorations intertwined, and with many objects on a page, is simply to compound the child's already existing confusion.

Before they are ready for even the clearest, simplest coloring book, many children will need a period of work with such subjects as apples, pumpkins, and so on, culled from reading readiness books or drawn by the teacher.

Stencils

Sometimes coloring is so difficult and frustrating for the child that it is necessary to introduce stencils. For suggestions in this area, see Stencils, in this chapter.

Tracing

Many children profit by a considerable period of tracing, either in addition to or before independent writing. A number of page-size cards of white tag board are needed. The cards first in the series should contain short vertical lines. The next cards contain simple abstract lines (⁄C / — ⌒ ∪ ˙); these include many of the strokes which will be needed in writing (see Figures 38 and 39). Following these come cards with large numbers and cursive letters. Lines, letters, and numbers on the early cards are 1 1/2 inches high, four lines to a page. Letters on the later cards should fit the writing paper used at this stage (see Figure 40). All lines, letters, and figures should be in color (felt pens may be used). The card is covered with onion skin or tracing paper held in place with paper clips or masking tape, and the child traces in crayon, matching the colors on the card. It may be necessary to make cards showing one line at a time. He should have only the amount of work that he can complete successfully.

From there he can go on to tracing, in crayon or pencil, letters and words on dittoed sheets, or on papers made to suit his individual needs. (The teacher may write letters and words on a ditto stencil, not more than two or three different letters per sheet (a line of m's, a line of i's, a line of mi, each line

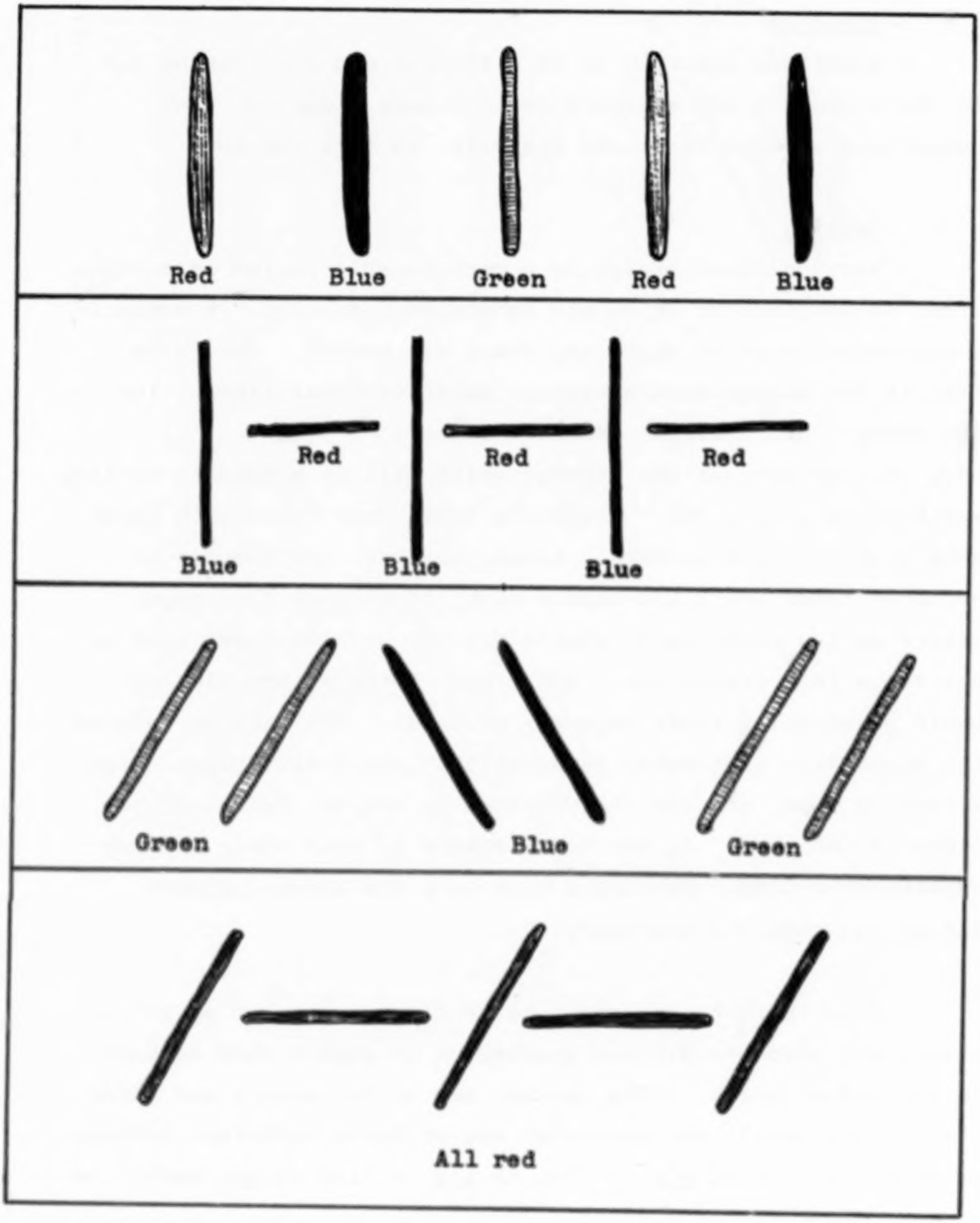

Red
Blue
Green
Red
Blue
Red
Red
Red
Blue
Blue
Blue
Green
Blue
Green
All red

Fig. 38.

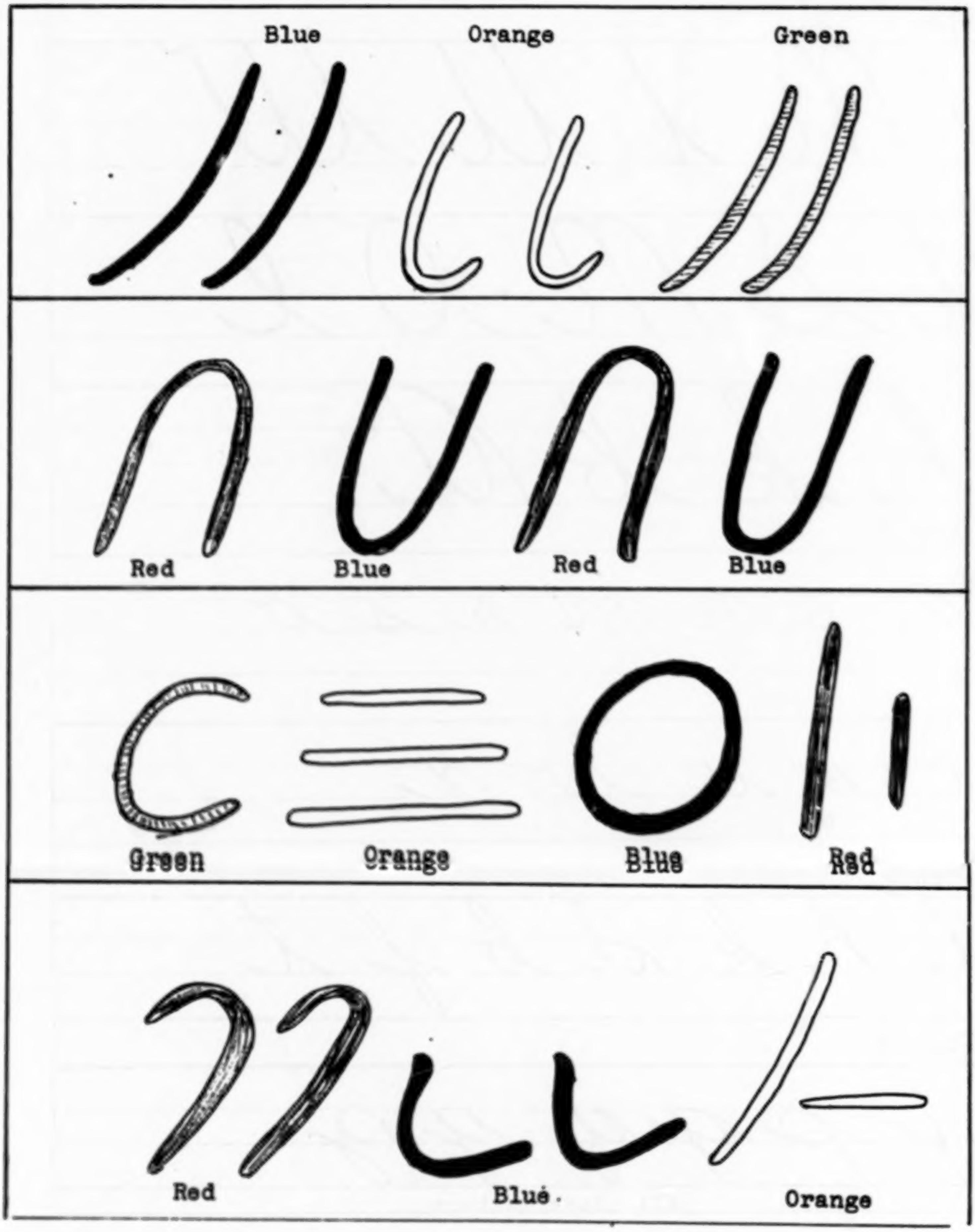

Blue
Orange
Green
Red
Blue
Red
Blue
Green
Orange
Blue
Red
Red
Blue
Orange

Fig. 39.

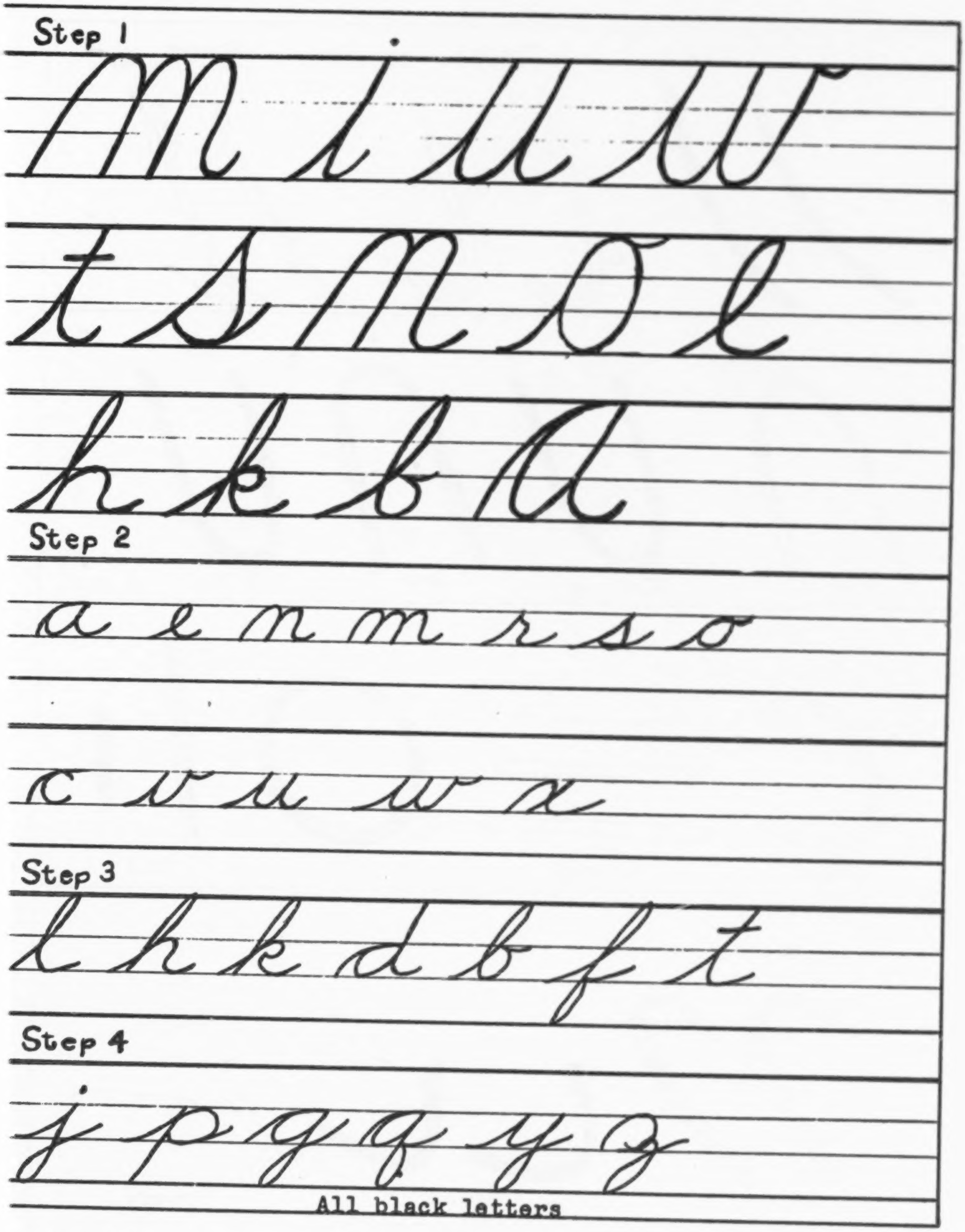

Step 1
Step 2
Step 3
Step 4
All black letters

Fig. 40.

repeated), and keep a supply for the child to trace over directly on the ditto copy.) As he moves into independent writing, some papers will include both tracing and space for his own writing.

Steps in Formal Writing

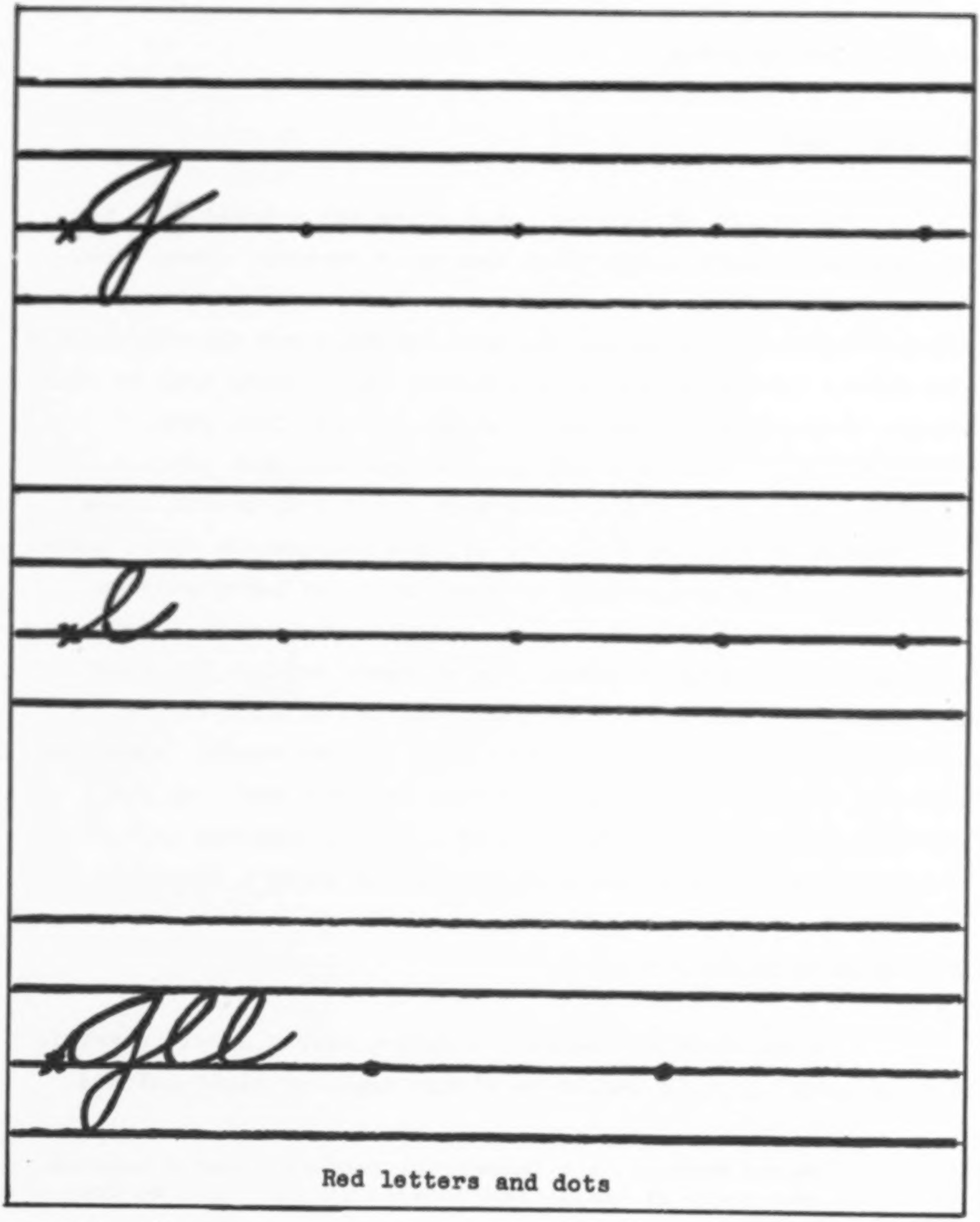
Since motor development is immature, the first letters to be taught are those requiring motions which develop earliest in the young child--those moving away from the body, as in (a list of letters in the usual order of teaching appears in Figure 40, but exceptions may be made for an individual child if his performance reveals a reason for doing so). Although the letter n might appear to be the next choice (after m), if should be delayed until other letters have intervened because children confuse the number of humps. The pointed letters, i, u, w, t and s are at approximately the next level of ease. Most difficult as a rule are a, o, d, c and q , which require first forward, then a backward motion. Particularly careful supervision is needed here, since many children form the habit of going around to the right (a) unless carefully guided. They easily confuse a and s for this reason.

Paper and Letter Size

It must always be borne in mind that the child's main problem is immature development. The teacher should begin with LARGE letters, which are easy for the child's eyes to perceive and his muscles to make. In formal writing, large letters will be at least 3 spaces high.

Specially lined paper should be used (see Figure 40). At first, the top and bottom lines are drawn in contrasting colors (using crayon or felt pens) until the child is able to stay easily within the lines. The lines in Figure 37 are usually not strong enough to guide the beginner. When he can make a few large letters successfully, he may try letters 2 spaces high. These two spaces should again be outlined in color if necessary. If, 1) he goes above or below the line, or does not touch them; 2) if his letters are less well formed than he can make; 3) if he begins to resist writing, and so on--this is evidence that he needs the colored lines. He will probably be ready for one-space letters by the time he is writing the letters with tails (see Figure 40, steps 3 and 4). If he is not, his paper should be ruled specially with spaces of the width he can handle (see Figure 41).

The teacher can experiment with the size of letters. Children vary considerably in the size of the writing with which they feel most comfortable; they are often able to select wisely if consulted. The paper should be lined in color as long as necessary. In later stages only the line to which attention must be drawn should be colored. The use and location of the lines will vary with the problem: for example, the space enclosed to guide one-space letters, the bottom line to show how far the tails come down, the bottom line of the middle space to stress that letters stay on the line. Colored lines should be omitted as soon as the child can do without them.



Red letters and dots

Fig. 41.

The teacher must always beware of setting up rigid patterns that will be hard to break.

Writing Tools

The choice of writing tools often has a great deal to do with the child's comfort and degree of success. Here, too, he can often help in choosing the best instrument for his particular level. In general, the more immature and ill-coordinated the child, the larger and more colorful the writing tool he will need: large crayons, smaller crayons, colored felt pens, "Magic Markers,"[1] large thick pencils, conventional pencils. Sometimes an older child's preference for a thin pencil comes not because he is able to handle it, but because the first grade pencil points up his feeling of humiliation at being able to write so poorly. In such a case, wrapping the pencil in modeling clay may give him the thicker, non-slippery surface he needs. For children whose posture is poor, the use of a 12-inch or 18-inch "novelty" pencil, sold in many variety stores, sometimes helps to keep the pencil pointed over the shoulder. In one instance, the use for a few days of a pencil attached to a golf stick worked a dramatic change in the child's posture.

Beginning to Write

The child should be seated facing away from all possible distractions; nothing should be within reach or sight but his paper, outlined in color, and his crayon or pencil. At the beginning of the top line, the teacher draws an m, 3 spaces high. She says, "This letter says 'mmm,'" and she gives him one or two examples (mild, mother, his own or a familiar name). Then she says, "Now let me hear you say 'mmmm'". Next, she takes his hand and has him make several m's with his index finger, then with his pencil until she can feel that he is beginning to sense the form. The teacher points out that he must start on the line for this and every letter. She has him sound each "m" as he makes it. Finally she may let him try one or two alone. If his effort is something like an "m ," he may get enough help from specific reminders and crutches to go on with independent writing.

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[1] "Magic Marker" is a commercial product, useful because the child can grasp it easily and because it adds zest to the writing process.

Common Problems

If letters are too short or uneven in height, it may be enough to have the child repeat them until they touch the top and bottom lines. The teacher should not accept anything that does not meet standards. If a child cannot succeed here, the activity should be postponed. If the "m" has the wrong number of humps, the teacher should write each hump in a different color; the child should then do the same. This device may also help if the child tends to write too hastily--which happens often (see Figure 42). If he makes too many letters on a line for proper form and spacing (perseveration), the teacher should draw a line where each letter should go (m__ __ __ __). If this is not sufficient, she may block

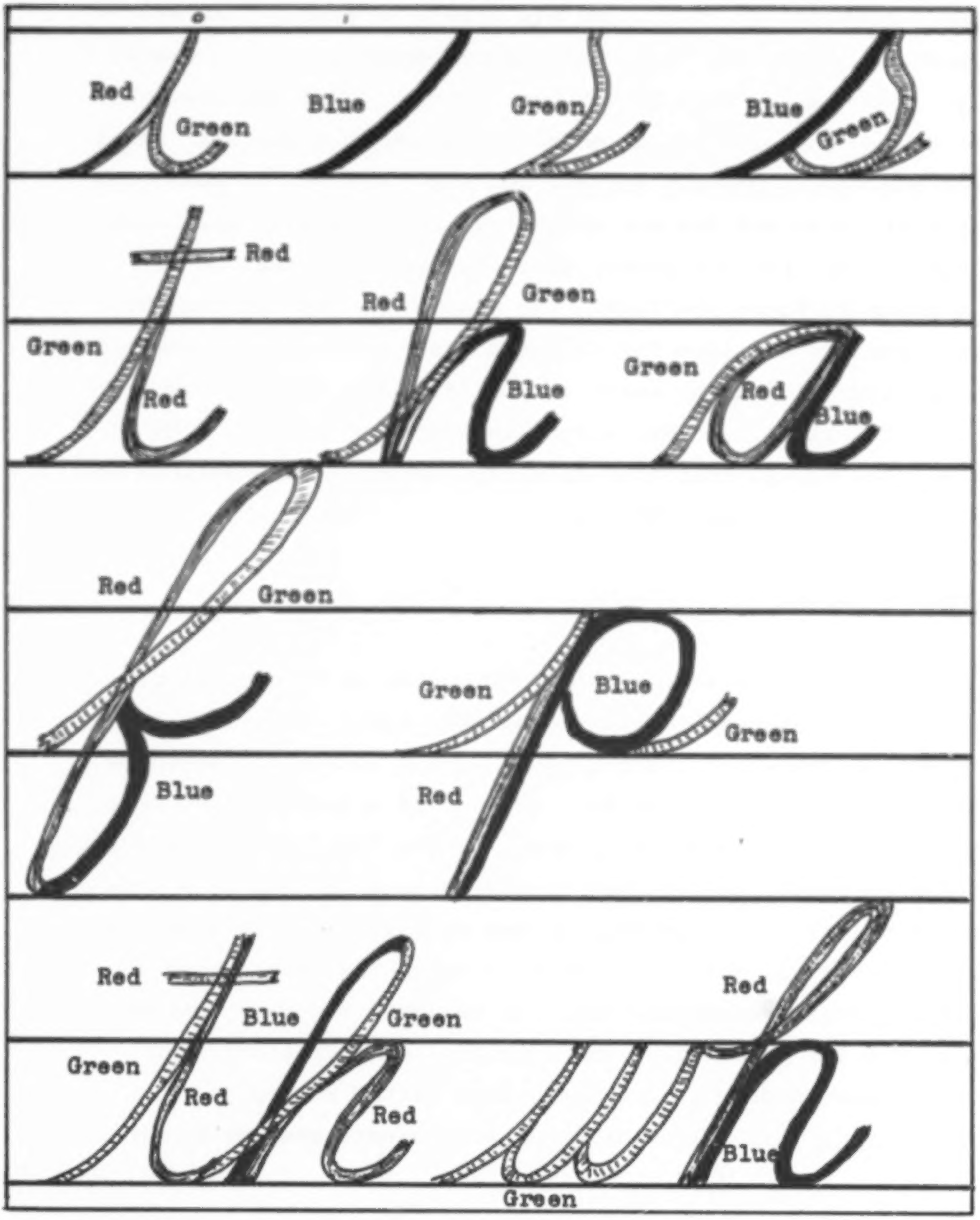

Red
Green
Blue
Green
Blue
Green
Red
Red
Green
Green
Red
Blue
Green
Red
Blue
Red
Green
Green
Blue
Green
Blue
Red
Red
Blue
Green
Red
Green
Red
Red
Blue
Green

Fig. 42.

off each space with a vertical line, colored if necessary (m ▮ m ▯ m ▮ ▯), or with masking tape.

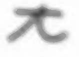
If his coordination is such that the paper slides and wrinkles under his hand, he may need a writing block. This can be a piece of board thick enough to take thumbtacks and large enough to take his paper. The child can soon learn to prepare the board himself. He may get and replace the board, and tack and untack the paper. These are among the activities the teacher may devise to give him intervals of physycal activity without getting him out of the mood for work. If a board is not available, a clipboard or a piece of heavy cardboard may be used (experiment to find the most comfortable size for a given child). The teahcer or the child can attach the paper, using masking tape at the corners.

If he cannot remember to start on the line, the teacher may draw a colored dot or small star to indicate the beginning of each letter (Figure 41).

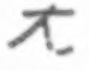
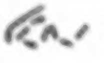
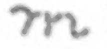
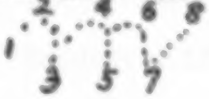
The teacher, working with each child, watches not so much what he does but how he does it. New techniques for solving the problems that stump the child will occur to each teacher.

Combining Letters into Words

As soon as he can write m and i, the child is ready to write and read phonetic syllables. The short sound of the vowels should be taught and combinations such as mi, mu, wi, wit, it, sit and so on should be made. As succeeding letters are introduced, all combinations must be sounded. This method may be continued through the alphabet. It is of great importance that writing be closely correlated with reading.

Just as the humps of the m must sometimes be highlighted in different colors, many of the other letters will also call for special guides. Most faithful and reliable of all helpers to the immature child is color. If he makes his t's like tents (), the teacher may make the upstroke in red, the down in green; she may give different colors to the dips of the w; she may color the arm of the b to help him distinguish it from the l ; she may make the upstroke of the one color, the swingback and around another. Wherever he has trouble, color may solve the immediate problem.

Another helpful approach, which relies on the early childhood interest in the sense of touch is through the use of the clay pan. A large flat pan is filled with modeling clay or "Play-Doh" (by the child if possible), and he writes the troublesome letter with a stylus (or an awl, or metal skewer from the kitchen). The resistance of the clay helps to fix the feel of the stroke in his mind.

Sometimes when the effort to combine more than one stroke into a letter is too much for a child, he can learn to do half the letter independently beginning by tracing the first part, as () or () () then finishing on his own. If numbers are among his strong points, a dot-to-dot puzzle may help  .

The teacher must bear in mind that the children find it hard to change any habit once formed; it is therefore important to have them try to write newly learned letters and words correctly and independently as soon as possible. This is better done in small doses. "My that is a nice m! Let's see if you can make one without looking at mine" --such comments do much good.

Personality Factors

All of the foregoing are valuable teaching techniques, but the teacher will succeed or fail in using them to the degree that she appreciates the special factors involved in the group's learning.

First of all, it is hard to overstress the importance of going slowly. This applies to the following.

Length of Lesson

Many children can do only one or two lines of writing in a day; very few can do a whole page. As always, the child and all his reactions must be watched to determine the size of assignment he should have.

Introduction of New Material

Ample time must be allowed for new learnings to settle in and become familiar. Enough days must go by before the teacher can be sure the child is really at home with the letters and words he has learned before he is presented with others.

In this respect his judgment is not too sure a guide. He may be ready for another step, or he may only be eager to succeed or to please the teacher. She must judge his strength and protect him from more of the failures which have accompanied all his efforts.

Use of the Group as a Tool

One of the most effective tools in reducing and relaxing this fear of failure is the group. A child can be so shy and tense alone that his mind scarcely seems to function at all. Yet the same child, watching or listening to another child falter, comes through time and again with answers and insights that were previously out of his reach. When his turn to perform comes, he too may falter; but by that time other children are having their turn at success, and the total amount of learning increases tremendously.

As discussed elsewhere, the teacher will use groups very sparingly in the early weeks; but writing, with its need for physical activity,is one of the safest areas in which to begin. This can be done at the board, with children taking turns writing and sounding letters and words. Four to six children, if necessary, may be writing at a large table, while the teacher supervises each in turn. She will do a better job with four than with six; she must continually make a choice, particularly in the first year in the process of trying to be in as many places as possible. The important point is that no child should ever be left to do his writing unsupervised until the teacher has made sure he has learned to make correctly the letters he is using. This is again because habits once formed are so hard for him to break that the unlearning will be worse for him than the learning.

Peer Relationships

The handicaps under which these children labor have been discussed elsewhere. Those handicaps have prevented the development even of normal, comfortable relationships with other children and with adults. Shyness, overaggressiveness, and a conviction that "nobody likes me" are so common that much real learning power does not become effective until the children can begin to feel happy with the people around them. One of the most productive situations for this type of growth is the writing group. With physical activity channeled into writing, the children begin to get acquainted through talking, through listening, and through simply being together. Since the ostensible purpose is not conversation, shy people can lie low and get their bearings while enjoying being with a group. Aggressive people learn to use speech instead of teasing and horseplay. Particularly at first, the teacher controls the talk to help keep down excitement and distraction, and she is as alert to teach good ways of getting along together as she is to teach good writing.

A variation of this approach is the practice of letting the children work together as friendships begin to develop. Often a job which seems like drudgery alone becomes fun when two work together. Often, too, a child who cannot feel at ease either with the teacher or in a group learns avidly from a friend--who in turn benefits from the experience of having for the first time something to give.

Need for Rest Interval

There are many times in the teaching of writing--as in every other area--when a particular step seems impossible for a child to master. It has been presented in every imaginable way, from every angle, and through every possible sensory approach. The child feels--and the teacher must almost agree with him--that this is something he will never learn. This is the time for the rest interval. The letter, word, or the activity must be dropped entirely. Let the child put it out of his mind, and the teacher likewise. It must remain out of mind from 2 weeks, a month, even months, until the child has had enough success in other areas to face up to it again. As always, the teacher takes her cue from the child. He may "ask" to take it up again, either by coming to watch the teacher working with someone else or by trying it on his own. When the task is taken up again after a sufficiently long interval, the teacher will frequently find that the child seems to have learned it almost magically in the meantime; he will have no further trouble. Sometimes this is because he has actually matured in the interval to a point at which he is now ready for the task. Sometimes perseveration has blocked him, driving him helplessly to do over and over the very action he wants to avoid. Because perseveration may be operating, the teacher can do much to avoid the need for long rests by changing immediately any activity in which the child repeats the same mistake several times. Whatever he does he is learning _something_. If he cannot be taught that he _can_ do it, he should not be taught that he _can't_!

Arithmetic

The number concept is rooted in the child's perception of objects in space. Numbers help the child to organize his environment, and help him to view the world in quantitative fashion. For example, he finds that 8 blocks take up more space than 3 blocks, that one thing is twice as large as another, that time and distance are divided into measurable units. All of these experiences are ways of viewing the world, and _form perception_ is basic to them. Until the child is able to perceive form, he cannot go on with arithmetic.

No matter how old the hyperactive child, he should be started at the beginning, both to get a new approach to numbers and to be sure he has a workable number concept. With the normal child, one can count milk bottles, rabbits in a picture, and so on. The child in this study, however, becomes more interested in the objects than in the number, and nothing must be allowed to distract him from the actual process of counting. A child may be able to say that 4 + 4 = 8, but can he look at dots in configurations and arrive at the right answer? Does he know that a similar process is at work? One cannot know, and for this reason, one must begin at the beginning.

Because of hyperactivity, a distractibility, and perseveration, the number experiences which normal children have in abundance lose their significance for a child in this group. Arithmetic must work with numbers and numbers alone, and activities should not be included which may cause the child to become lost in them.

For much of the time, the teacher must prepare and provide the materials that the child uses. This is necessary for many reasons:

1. The child will need many manipulative materials to help overcome motor disinhibition and perseveration.
2. The worksheets must call for only the amount of work he is able to do successfully.
3. Each new factor must be repeated over a longer period of time, and it must be varied in as many ways as possible.
4. The page of a commercial workbook is so crowded and full that the child cannot tolerate it.
5. The purposeful use of color on each teacher-prepared paper will help the child attend to the task before him.
6. He must be given a carefully calculated starting point and ending point to help him establish himself in space.

The following material need not necessarily be presented to the child in the order given here. It is, however, set down in developmental sequence. Testing will show the teacher where the gaps are. If she remembers that progress comes slowly and learns to take her cue from the child, she will be able to determine when he is ready to go on to another step.

Materials

The most important of the manipulative materials needed in the beginning stafes are sets of cards variously shaped and variously colored. Each type of card will be seen to have a particular purpose. The teacher may find it convenient to make these materials well in advance of class use; or she may find an interested parent who is willing to take over their preparation. In the techniques which follow these directions, the corresponding cards will be referred to by the name given them here.

Set A--Color-pattern Sorting Cards

Cut about 30 cards 2 1/2 inches square from tagboard. Draw a circle or spot in blue on each of 5 cards, 2 spots in yellow on the next 5, 3 in orange on the next 5, and so through 6 spots. The spots are to be arranged in domino patterns (see Figure 43). (Since many of these have to be prepared, stencils could be made. The stencils could be used by the children to good advantage.)

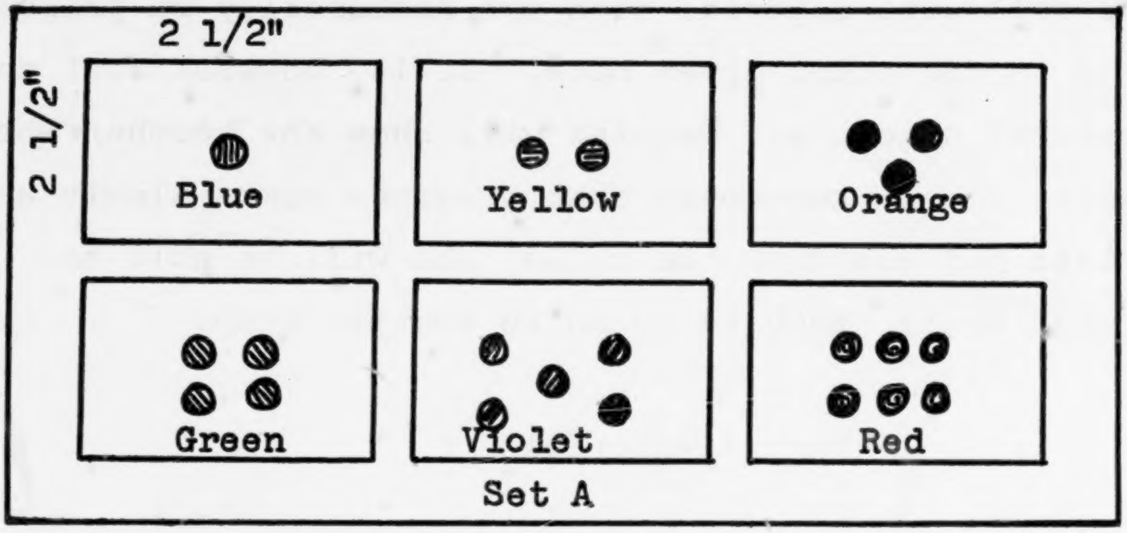

2 1/2"
2 1/2"
Blue
Yellow
Orange
Green
Violet
Red
Set A

Fig. 43.

Set B--Two-color Matching Cards

Cut 36 strips of cardboard (heavy weight or corrugated) about 2 by 4 inches. Then cut 72 squares of construction paper 2 by 2 inches, using only the 6 primary and secondary colors. Paste one of the colored squares on each half of each cardboard strip, taking care to vary the color combinations as widely as possible, and bind the edges with Scotch tape (see Figure 44).

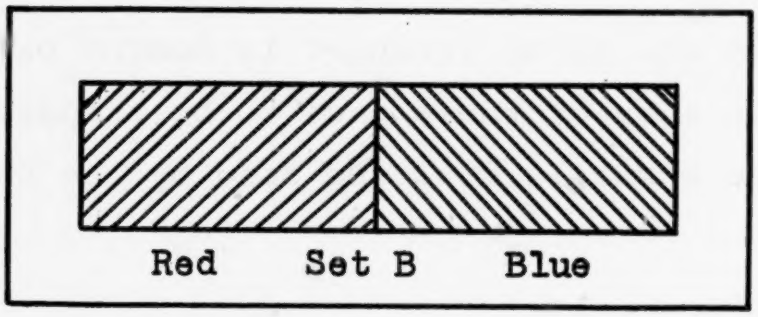

Red
Set B
Blue

Fig. 44.

Set C--Varicolored Domino Cards

Cut about 30 strips of tagboard 2 by 4 inches, and draw a black line down the middle of each strip to mark the strip into 2 squares. In each square draw from 1 to 6 spots in the standard domino patterns. However, all the 1's are to be drawn in one color (blue, for example), the 2's in another, and so on through the 6's (see Figure 45).

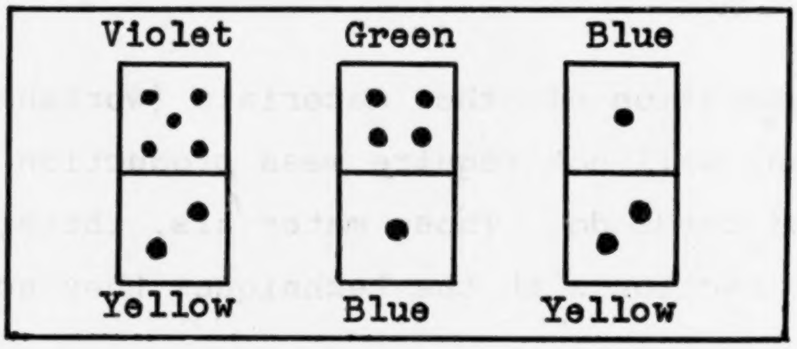

Violet
Green
Blue
Yellow
Blue
Yellow

Fig. 45.

Set D--Solid Color Domino Cards

Prepare about 30 or more domino cards, as in Set C, and divide them into 6 decks of 5 or more cards each. Again draw the standard domino combinations; now, however, each deck is to be in a different color: one deck with all blue spots, another deck with all yellow spots, and so on (see Figure 46).

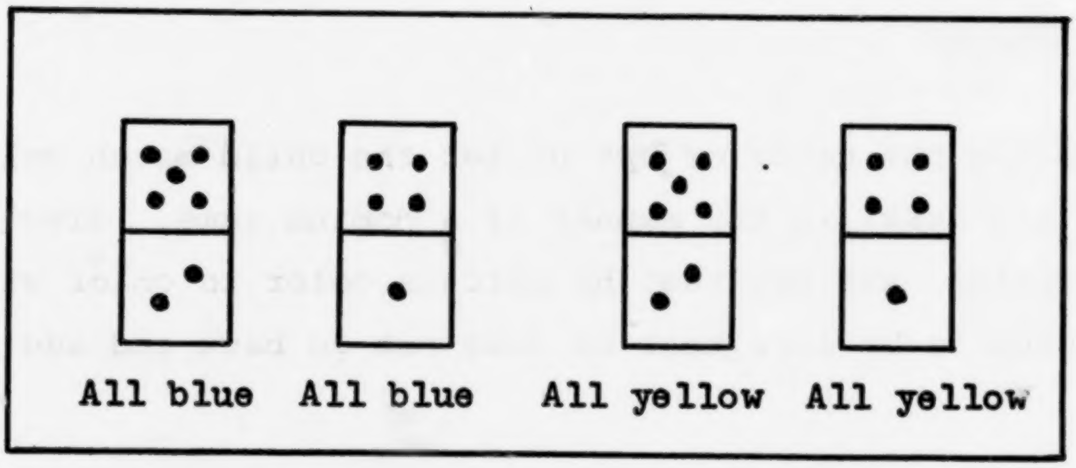

All blue
All blue
All yellow
All yellow

Fig. 46.

Set E--Black and White Domino Cards

Prepare about 30 or more domino cards, as in Set C, and draw the standard domino patterns in black.

(Note: the domino spots in Sets A, C. D, and E can be stamped, using the eraser end of a new pencil and a variety or colored stamp pads as "tools." The gummed gloss paper forms listed under "Materials to Order" will save much time.)

The preparation of other materials (worksheets, number cards, and so on) will not require mass production to the extent that the sets of cards do. Those materials, therefore, will be described in connection with the techniques they accompany.

Getting Ready for Numbers

Matching Patterns

Using the cards of Set A, place one card of each configuration on the child's desk, and give him a few of the remaining ones. He is to match his cards with the 6 "models," using color as a guide. If he cannot handle many cards at once, reduce the number of models from 6 to 3.

Matching Colors

Using the cards of Set B, let the child match color to color on his desk, in the manner of a domino game. Give him a starting point, and see that he matches color to color with no gaps. Check to be sure that he does not go back and add any remaining cards at random. He should stop when he can go no further. The essential point of this step is to introduce him to the domino shape and to the principle of domino matching--using color as a guide.

Matching End-to-End

Place one domino card of Set C on the child's desk, give him a few cards of the set, and let him find the card one end of which matches one end of the first card. Let him place the two identical configurations next to each other, in the manner of a domino game; he will still use color as a guide at this step, but he may also gain a sense of the configuration itself. Let him continue in this way. If he has trouble at this point, it may be necessary to cover one half of the card, or even to return to Set A for a time.

Matching Without Color Guide

Using Set D, begin another domino sequence similar to that introduced with Set C. The essential point at this step is gradually to free the child from dependence on color, and to fix his attention on the configuration or form itself. Here again, if the child is not successful, he should return to working with one of the earlier sets of cards. To the extent that he is successful, the variously colored decks in Set D may be used interchangeably or all together.

Independent Matching

Set E may be used in the same manner. At this point the child's recognition of forms is (or should be) so well established that he does not have to rely on color at all.

Introducing Numbers

Number Symbols

Prepare several 2 by 2-inch cards containing only the number symbols from 1 to 6. Place 2 of the symbol cards (for example, 1 and 5) on his desk, give him several other 1's and 5's, and have him match the latter with the models. Each day, add to the symbols until he can distinguish clearly and easily between all 6 of the numbers. At this stage, the names of the numbers are not introduced; the point here is only to be able to distinguish one symbol from another.

Number Names

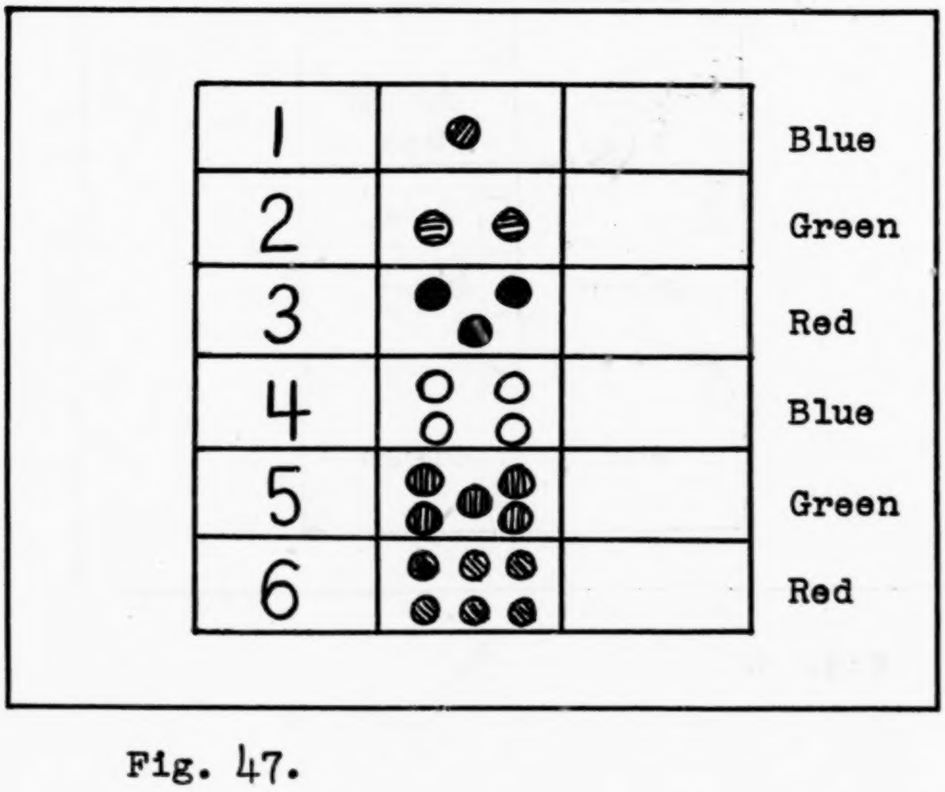
Now the dot configurations and symbols may be brought together. Use the symbol cards and a deck of the cards from Set A. Point to the first card of the "A" set and say, "This is one;" then point to the first symbol card and say, "Here is another way to say one." Work backward and forward between dot and symbol, and add other dots and symbols as the child's comprehension allows.

Matching Numbers and Symbols

Use a few cards from Set A and the number-symbol cards from 1 to 6. Let the child match the symbols and configurations (spots). It may be possible also to use the cards from Set E (black and white domino cards) and continue the matching technique. (The use of Set E rather than Set A will tend to remove any possible color cue for the child; the color cue, essential at the early levels, must eventually be done away with.)

Reference Chart

When the child is sufficiently skilled at recognizing symbols and matching them with configurations, he may be given a chart made as in Figure 47. The chart should be kept at his desk for constant reference. (The blank third column is for the words--number names--themselves, which will be added at a later stage.)



Add words
later

Fig. 47.

Worksheets

The teacher may now introduce worksheets (see Figures 48 and 49) for the child to complete. The child may draw in the spots, or he may paste in 1-inch squares or circles of colored paper supplied by the teacher. These papers may be presented in a number of ways to help him with his attention span and distractibility.

1. Vary the colors of the numbers until you think he can select whatever color he wishes, then write the symbol in black.
2. Use different colored stamp pads and the eraser of a new pencil, so that he can stamp the number pattern.
3. Let him make his own number patterns with his crayons. (It may be helpful to fold the paper and expose only one example at a time.)

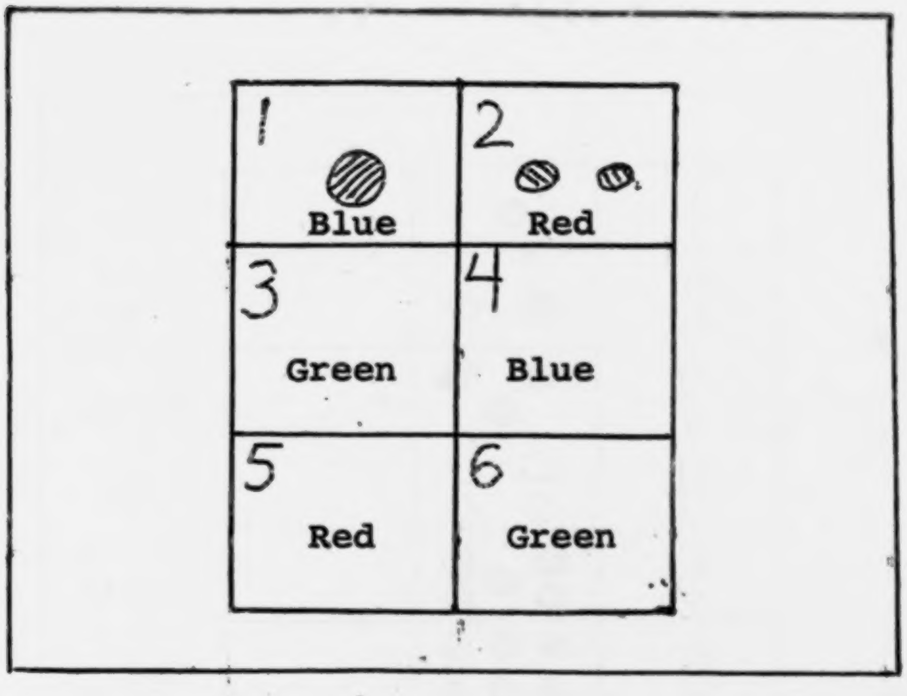


Fig. 48.

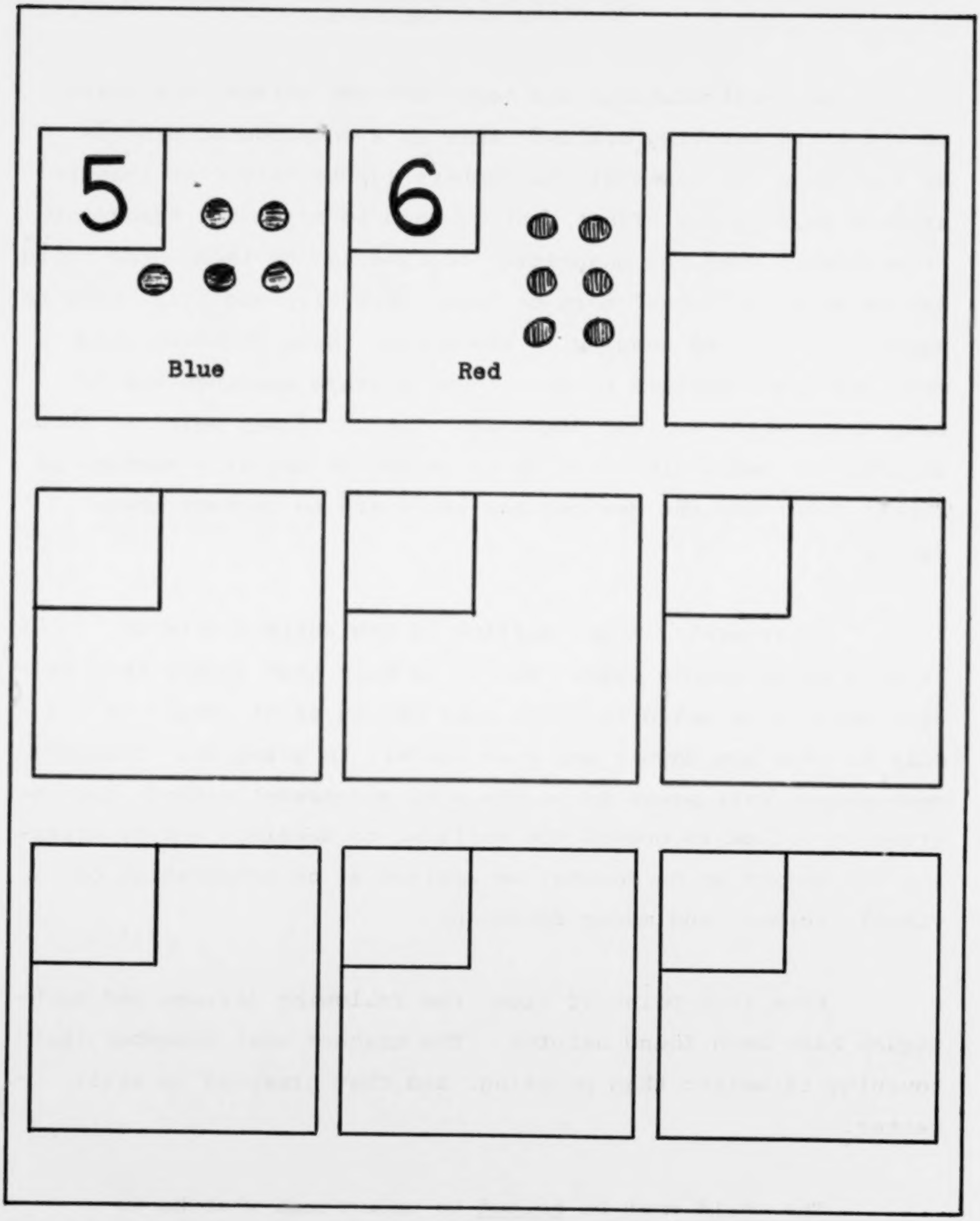


Fig. 49.

Counting and Tallying

As configurations and names are recognized, the child should start counting orally. This is a complicated process. He will know the names of the numbers (up to "six," at least); at this point every effort must be made to bring the names into relationship with the quantities represented by them. The child may be able to "count" more or less correctly, and still have no number concept--no meaning in the words. Some children need many different devices to help them to learn sequence and to keep their place in that sequence. The child may point to three objects but meanwhile count up to seven; he may skip numbers or repeat them; and the devices are necessary to correct these faults.

In general, it may suffice if the child points to objects as he counts them. But it is more than likely that he will have to be asked to touch each object as he counts it (if only to slow him down); and even better, to grasp it. Grasping each object will prove to be the most successful method, for the grasping reflex is one of the earliest to develop; and by grasping the object as he counts, he arrives at an integration of visual, verbal, and motor functions.

From this point of view, the following devices and techniques have been found helpful. The teacher must remember that touching is better than pointing, and that grasping is still better.

The child must be helped to understand what he is supposed to do. It is above all necessary to keep his tasks within the range of his ability and to make sure that he understands what he is doing.

Counting Blocks or Beads

Several blocks are put before the child. The teacher says, "Give me one block;" then "give me two blocks," and so on. The average limit of perception as a single impression is a group of four blocks.

Large Peg Board

The number symbols are written on a strip of tagboard, each symbol in a different color, and the symbols spaced as far apart as the horizontal rows on the peg board; this strip is then taped at the left edge of the board (see Figure 50). The child, using pegs to match the color of the symbol, inserts

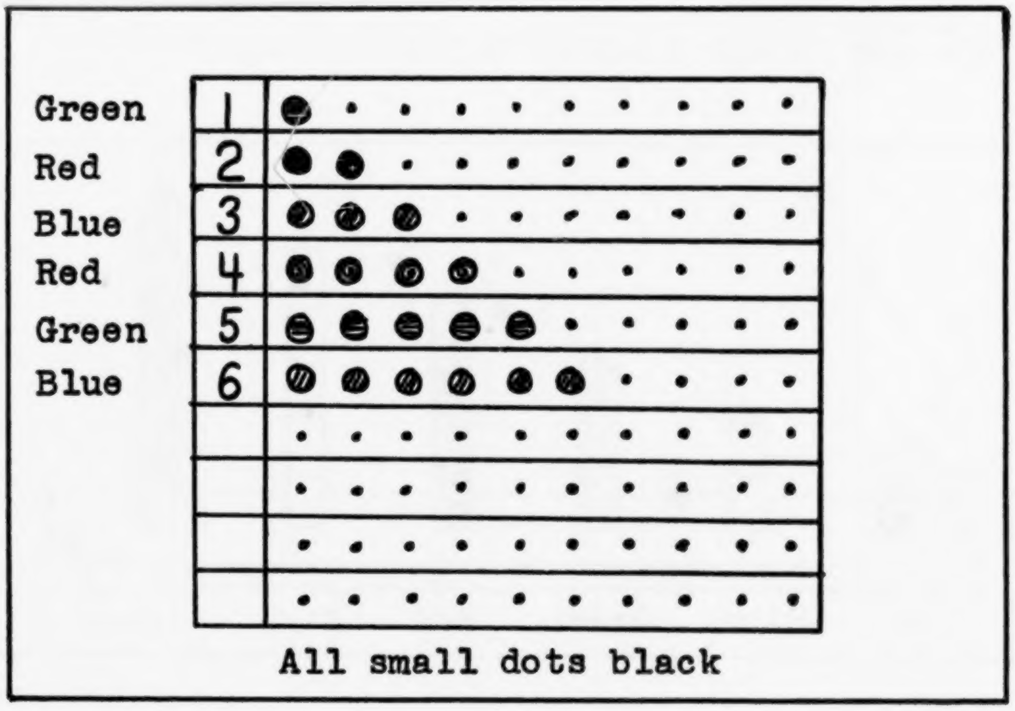


Fig. 50.

the proper number in each row. When this work is checked, the child is asked, "Show me the number that says 3." He shows it, and then is asked to give it to the teacher. He takes the pegs out one at a time, counting each one as he removes it.

Colored Cubes

A series of dowel rods of different lengths, mounted on a board, and a number of drilled colored cubes or spools are needed (see Figure 51). The child puts as many on each dowel as it will hold, counting each cube (or spool) as he places it on the rod. At this point, the questions, "Which is more" and "Which is less" can be introduced; and parallel to this, counting 1 through 6. Have the child count the cubes as he puts them on the dowels. Questions such as this could be asked: "Show me 4." "Show me 6." "Which is more, 4 or 6"--the teacher pointing to the 4 as she says it, and likewise to the 6. Each time she must wait for the child to give his answer. When she thinks this has been established, she may proceed with "Which is less."

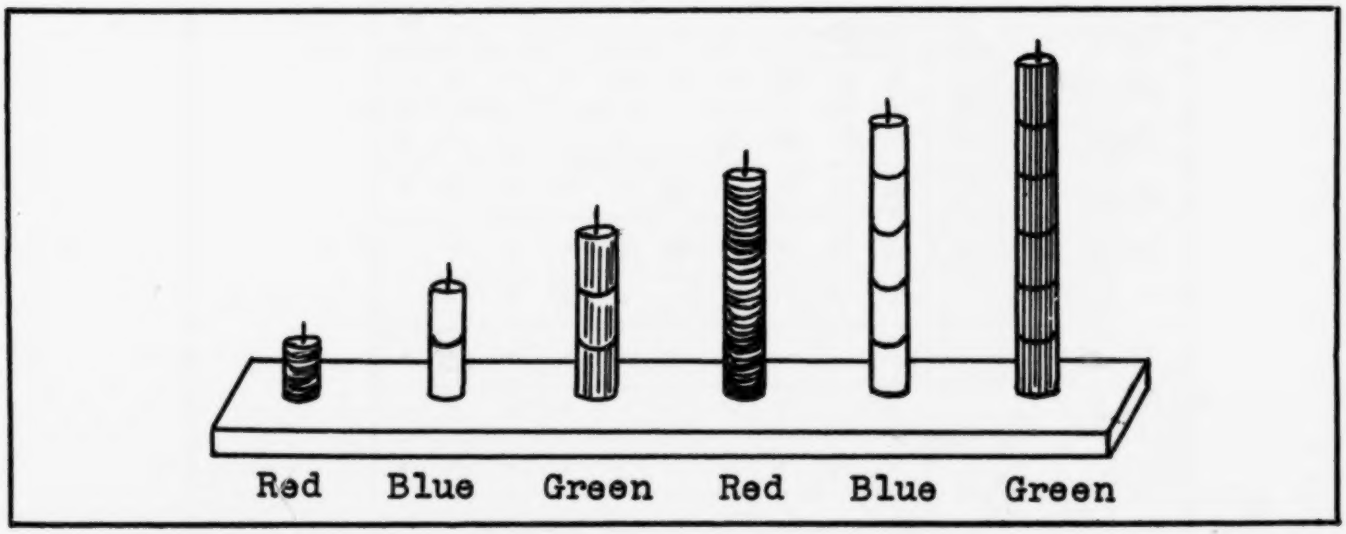


Fig. 51.

Bead Box

Make a box about 9 by 12 by 1 inches, and place into it a set of 6 cardboard divisions. (Slit the sides of the box so that cardboard strips can be inserted; or strips are stapled to the sides.) The numbers that the child is learning are placed in varying arrangements on strips which are slipped in turn under the division strips (see Figure 52). The child puts the corresponding number of beads into each section. Check in the same way as mentioned above.

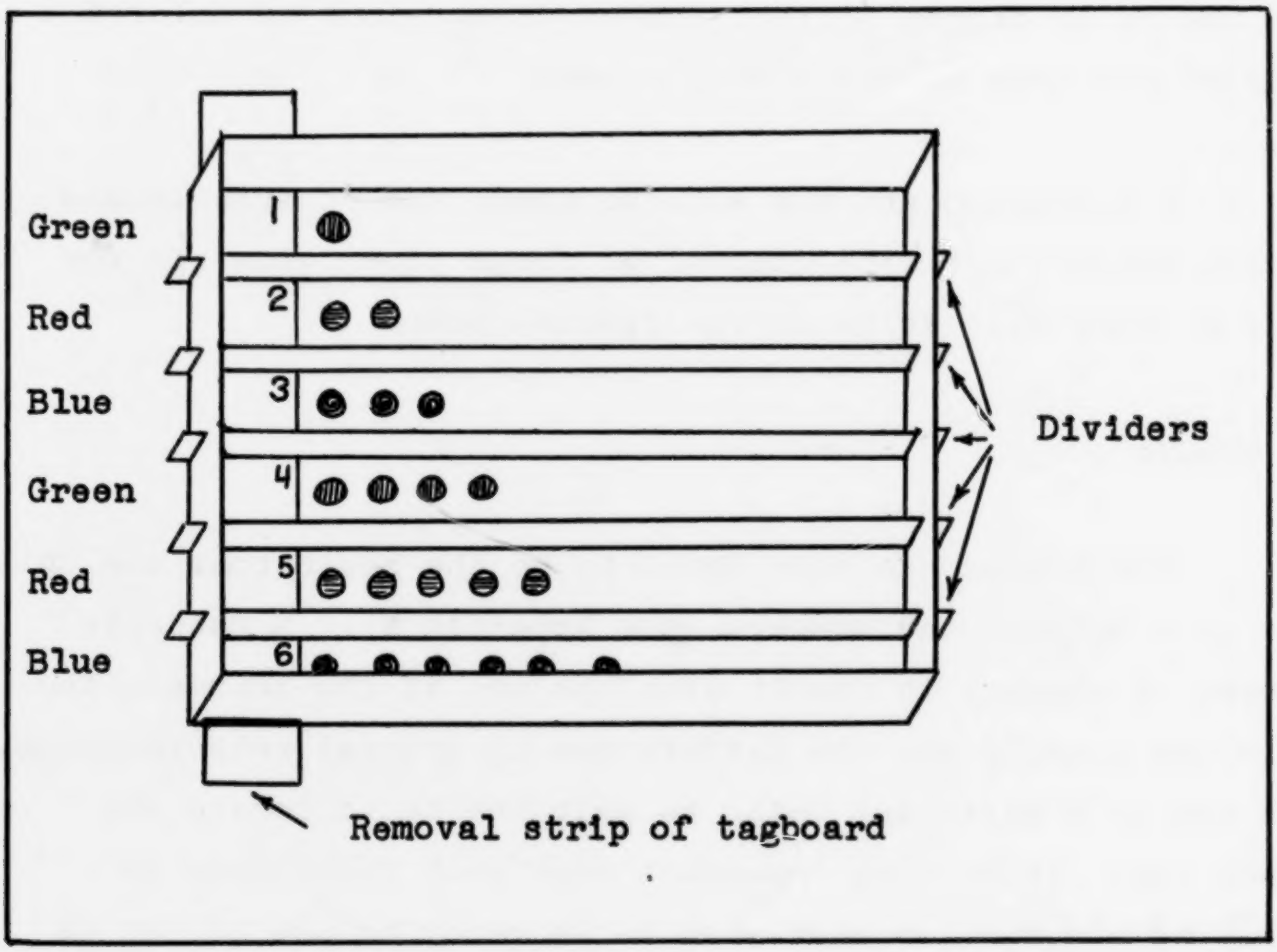

Green
Red
Blue
Green
Red
Blue
1
2
3
4
5
6
Dividers
Removal strip of tagboard

Fig. 52

Other Devices

A piece of construction paper is marked off with black crayon line in rows across the paper. A number the child is learning is placed at the left of each row. The child puts a corresponding number of objects (blocks, magnets, and so on) in the spaces beside each number (see Figure 53).

This work may be varied by pasting, stamping, and lastly, after much success, he may draw as many as he needs.

Desk charts may be used; put number symbols at left. Then the child places correct number of cut-outs of colored paper or pictures by the number symbol.

A flannel board may also be used; number symbols and circles are cut out with flannel or rough paper glued to the backs so they will stick to the flannel board.

The Abacus

The abacus has been found to be the basic tool the child uses in understanding numbers (see Appendix B). A concrete concept of numbers is taught with the use of the abacus. The child can readily see the differences in spatial relationships. Each row is a different color to help the child locate the number row. It is very important that each child have an abacus of his own, so that when he is ready to use it, it is at his side.

6	Red
4	Green
1	Violet
3	Orange
5	Red
2	Blue
6	Green

Fig. 53.

Have the abacus strung 1 to 6 or simpler if necessary (see Figure 54).

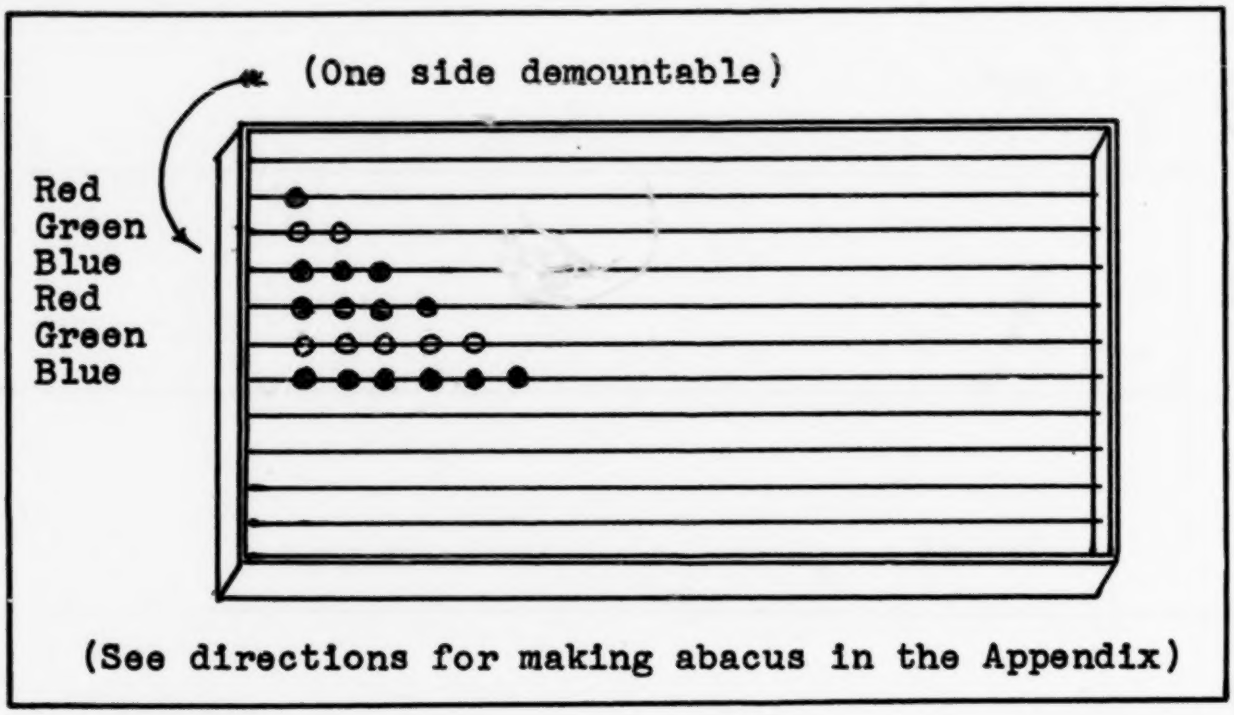

(One side demountable)
Red
Green
Blue
Red
Green
Blue
(See directions for making abacus in the Appendix)

Fig. 54.

As the child counts the beads, he pushes them over. For 1, he pushes over the row with one bead on it; for 2, the row with two beads on it, and so on.

Another advantage of the abacus, for example, is that the child learns to see the threeness of a number. Ask the child to make each row say "3." He begins the row "3" on the left, then makes all the other rows match it by pushing the extra beads to the right on each of the following rows. Then he may do the same for the other numbers.

When the teacher feels that the child has a good understanding of numbers 1 to 6, she is ready to teach him groupings. She asks the child to push over "4." Then she shows him all the ways he can make 4, such as pushing 1 and then pushing over 3 (in the same row), and so on.

A standard abacus with all but one row removed can be introduced at this point (see Figure 55). Here the child is helped to see numbers in a linear position. Ask the child to push over 2 beads, 3 beads, and so on. It is hoped that by this time the child will see 4 has 2 and 2 and will push over the beads in groups. Using this abacus will thus be another means of helping the child to learn groupings. All of the work on the abacus has been done orally.

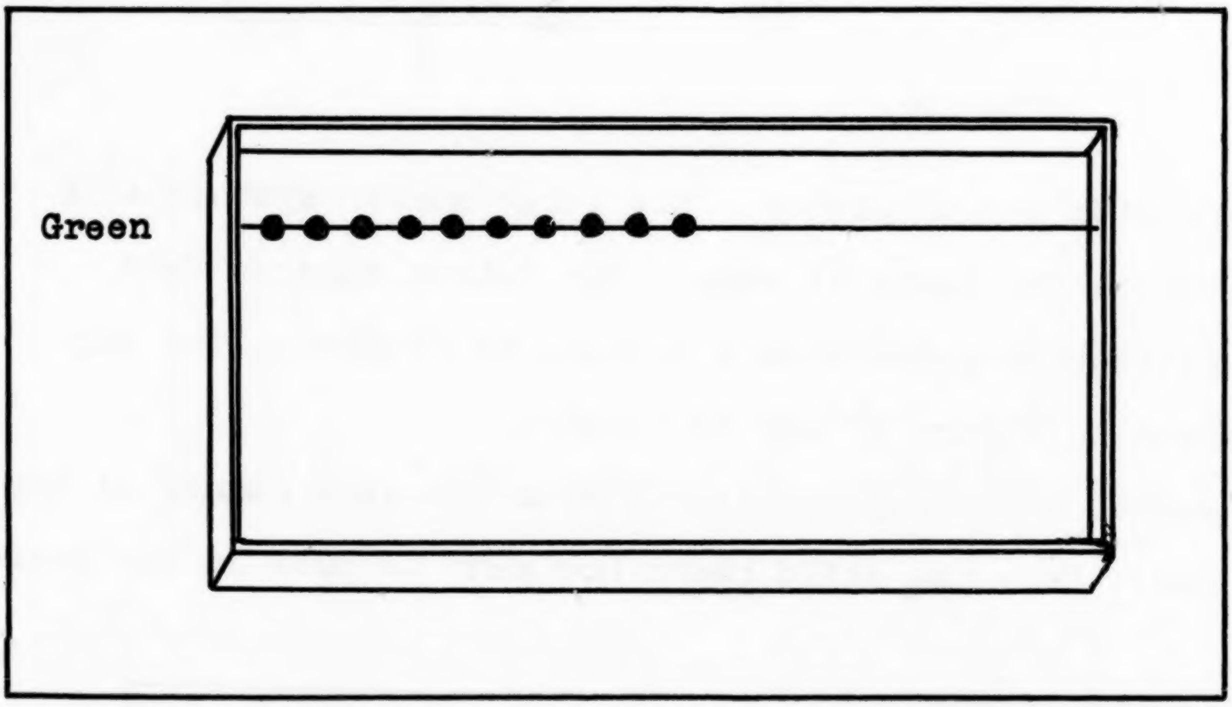


Fig. 55.

Groupings

A device can be prepared from corrugated cardboard as follows (see Figure 56). (The Stern Blocks for Structural Arithmetic, Houghton Mifflin, are ideal if money is available.)

Glue together 1/2-inch colored cubes to make the desired grouping. Make several sets, each a different color.

Individual flannel boards may be used by children who

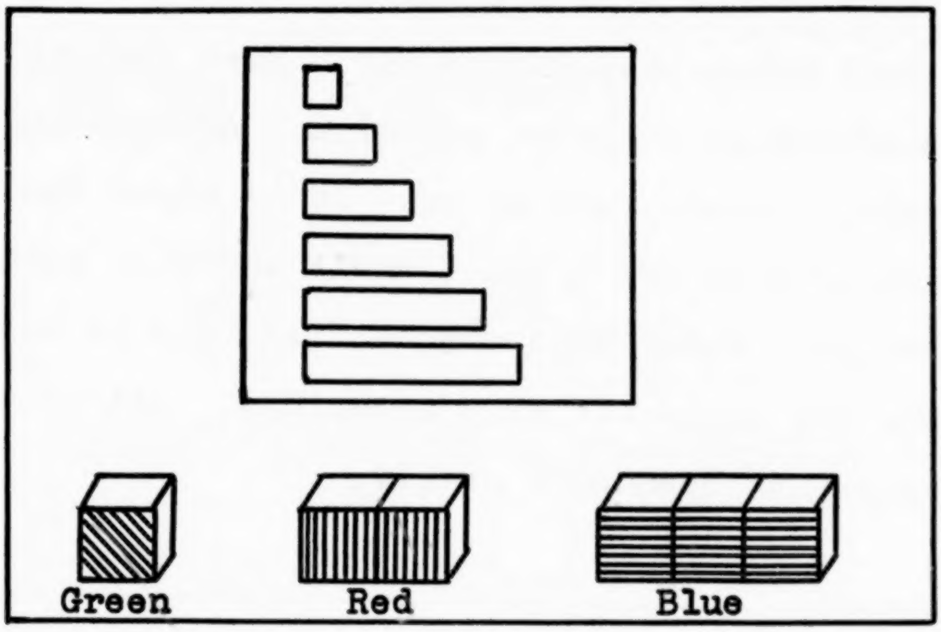

Green
Red
Blue

Fig. 56.

need to work with larger pieces. Cut large number symbols with flannel glued to the backs of each. Cut 2-inch squares from colored construction paper with a backing of flannel. The suggestions shown in Figure 57 may be helpful.

A magnet board may be used in much the same manner as the flannel board. Here the child hears how many he puts on the board.

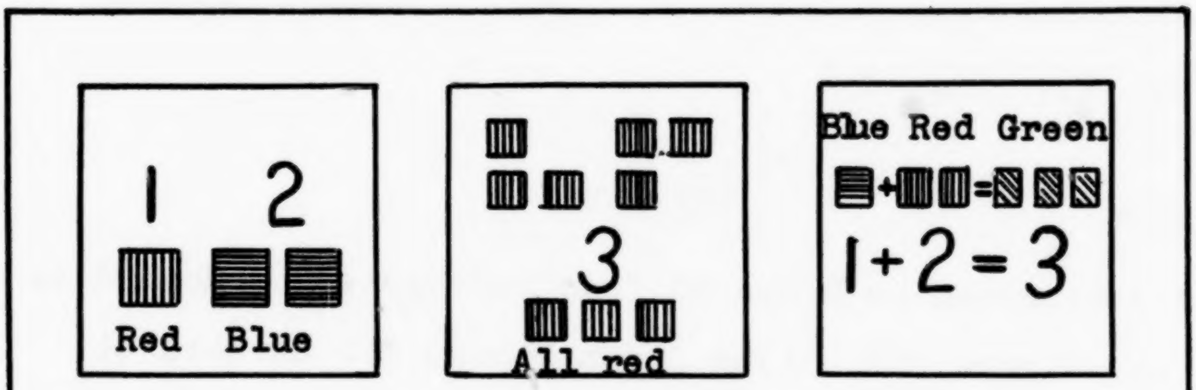

1 2
Red Blue
3
All red
Blue Red Green
1+2=3

Fig. 57.

Analysis of Configurations

Give the child several 1-inch blocks of the same color. Place 3 blocks in this pattern (see Figure 58-a). Then ask

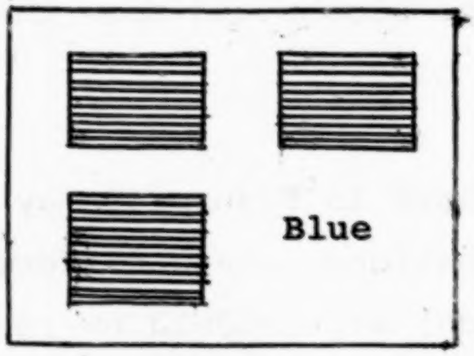


Fig. 58-a.

the child to add as many as he needs to make it say 4. Then change the configuration as seen in Figure 58-b, and repeat.

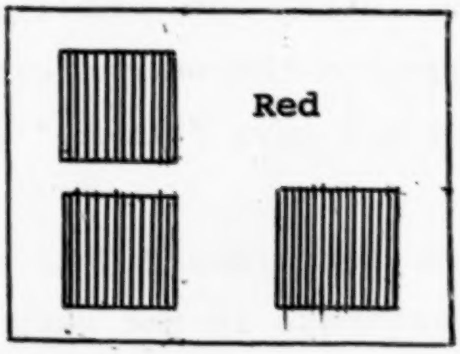


Fig. 58-b.

On a piece of paper write the configuration Ask the child to complete it to make 4, and so on.

Later the configuration may be completed in a linear arrangement--6--□□□ ________. In this problem the child is asked to add enough squares to make it say 6.

The following suggestions may be helpful:

1. The child may be given plain blocks, and work orally.
2. He may work with pasting and stamping papers.
3. He may draw the squares himself with crayons.

Add Sign (+)

The most concrete presentation is to call the add sign "and." First use beads or blocks and show the child that "2 blocks and 1 block are 3 blocks."

Papers such as shown in Figure 59 may be prepared. In writing the number combinations, use a different color for each number; the plus (add) sign should be in black. The child first pastes or stamps the number of colored circles to make the combination. Then he writes the answer in the box at the right of the line. **NOTE:** the child should be shown how to get his answer by counting (using the number 2 as his starting point); he places his finger on the second circle and says "two;" on the third circle and says "three," and so on.

Likewise in another form (see Figure 60). The number 3 and the number pattern are made in the same color; similarly other numbers and number patterns must agree. The child is asked to fill in the right number of dots (as in the illustration) and write the answer.

Still another version may take the form seen in Figure 61. The numbers are written in one color, and the boxes in another. The add sign is in black.

Later papers may be made with pen or pencil (that is, without color), and may contain several examples on each paper.

Numbers 7 to 10

Add to the large abacus rows 7, 8, 9, 10, each in a different color. Work with these numbers in the same way as

Red 2 + 1 Green	● ● ● Red Green	3
Blue 3 + 2 Red		
Green 1 + 2 Violet		
Red 2 + 2 Blue		
Blue 1 + 3 Green		
Green 3 + 3 Red		
Red 1 + 1 Violet		

Fig. 59.

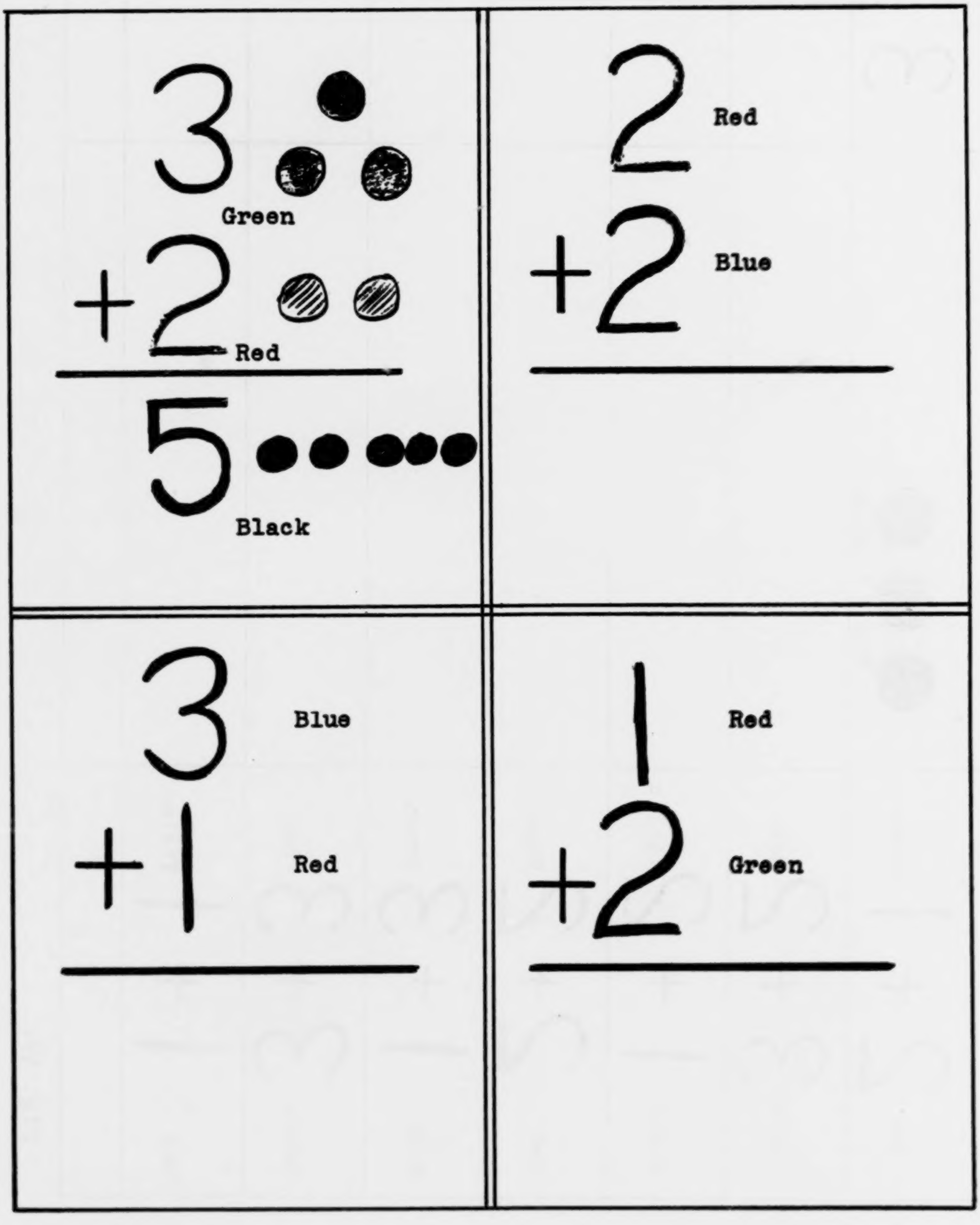

3
Green
+2
Red
5
Black
2
Red
+2
Blue
3
Blue
+1
Red
1
Red
+2
Green

Fig. 60.

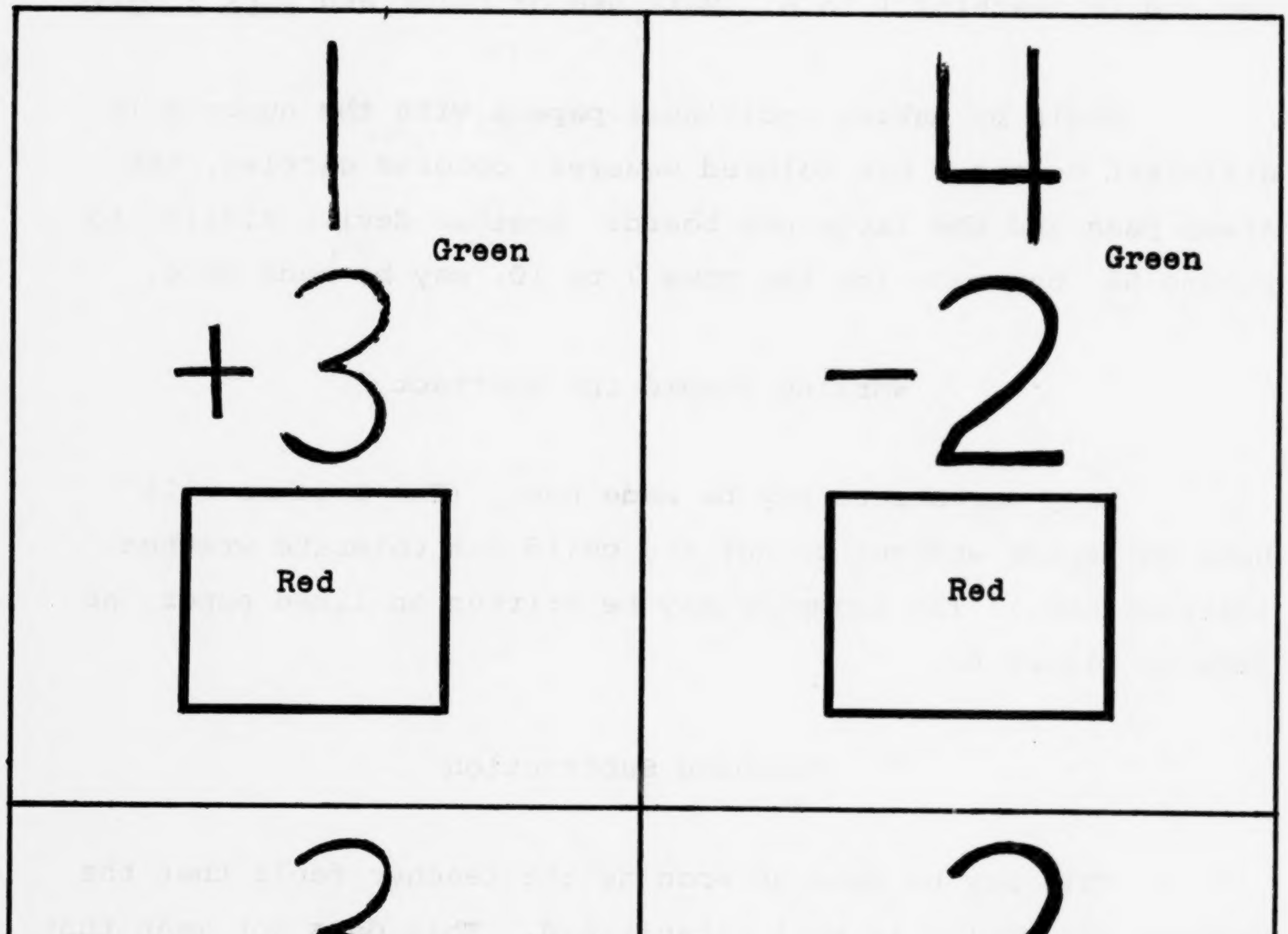

1
+3
Green
Red
4
−2
Green
Red
3
−1
Green
Red
2
+3
Green
Red

Fig. 61.

you did in teaching 1 to 6. Make use of color and *work slowly*.

Begin by making individual papers with the numbers in different colors. Use colored squares, colored circles, the stamp pads and the large peg board. Another device similar to Figure 56, but made for the rows 7 to 10, may be made here.

Working Toward the Abstract

Many worksheets may be made now. (The teacher will have to decide whether or not the child can tolerate written instructions.) The examples may be written on lined paper, as seen in Figure 62.

Teaching Subtraction

This may be done as soon as the teacher feels that the process for adding is *well* established. This does not mean that all addition facts are taught before subtraction is introduced.

Using the one string abacus, have the child push (to the right) 5 beads. Ask him to take away 2. Then ask him to tell you how many are left. Do this many times with different combinations. Then write an example on a piece of paper. Show the child how to begin with the number written on top. Have him push over on his abacus that number. Then show him the number under the top number and the minus sign (see example below)--and say, "This tells us to take away this number." Show him how to take from the number he has pushed over. Show him that what is left is his answer, and that he writes it on his paper.

Example:

$$\begin{array}{r} 5 \\ -2 \\ \hline 3 \end{array}$$

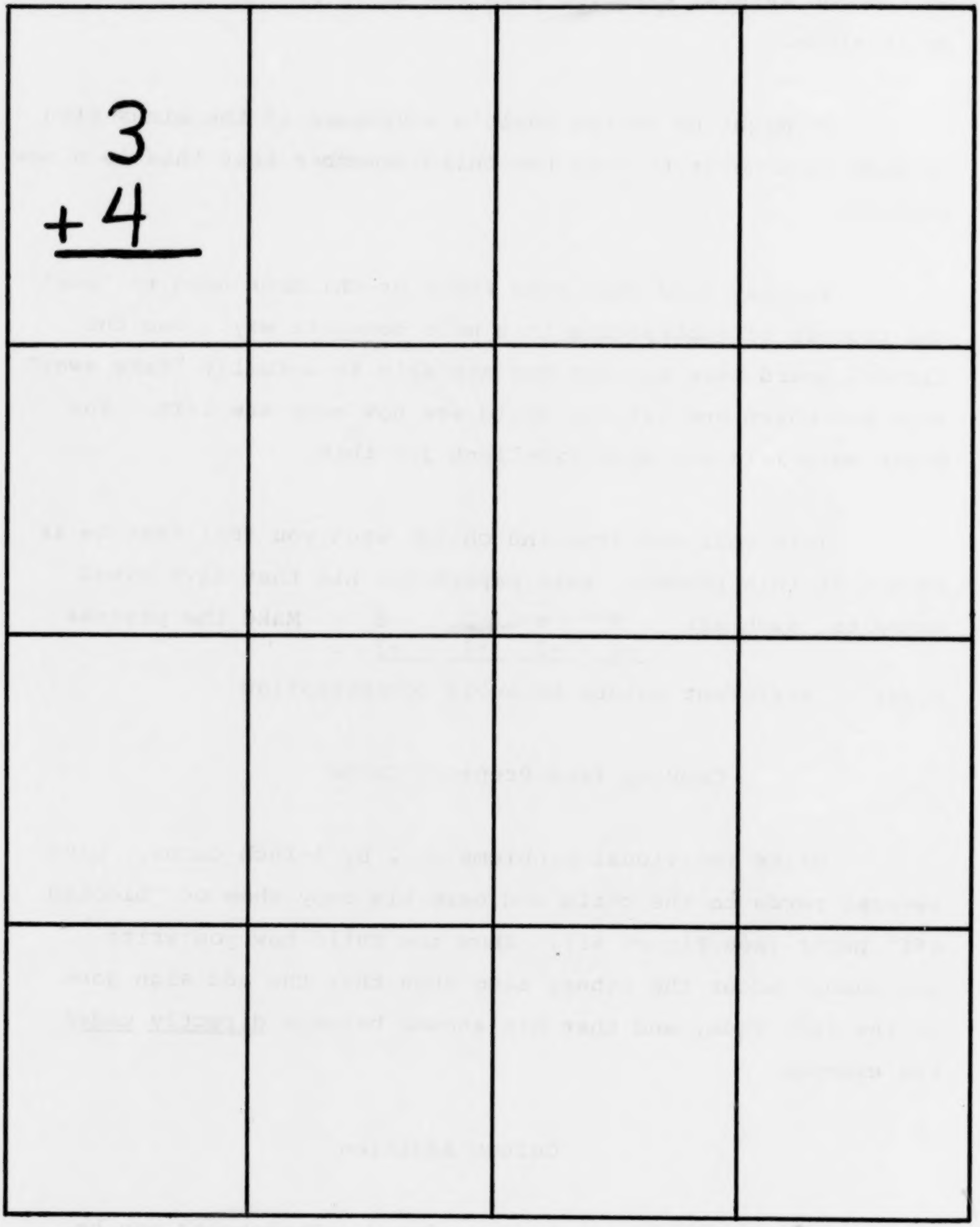


Fig. 62

Go through several examples with him until you feel that he can do it alone.

It might be to the child's advantage if the minus sign is made in a color to help the child remember that this is a new process.

You may find that some child or children need to "see" the process of subtraction in a more concrete way. Use the flannel board here so that you are able to actually "take away" from the board and let the child see how many are left. The Stern materials are also excellent for this.

Take your cue from the child; when you feel that he is secure in this process, make papers for him that have mixed examples, such as: $\begin{array}{r} 3 \\ \underline{+1} \end{array} \quad \begin{array}{r} 4 \\ \underline{-2} \end{array} \quad \begin{array}{r} 2 \\ \underline{+4} \end{array} \quad \begin{array}{r} 6 \\ \underline{-3} \end{array}$. Make the process signs in different colors to avoid perseveration.

Copying from Prepared Cards

Write individual problems on 2 by 3-inch cards. Give several cards to the child and have him copy them on "blocked off" paper (see Figure 61). Show the child how you write one number under the other; also show that the add sign goes to the left side, and that his answer belongs directly under the example.

Column Addition

Sums up to 10 may be introduced. Worksheets may be prepared with the directions written across the top. Use the combinations in as many ways as possible. Here again the add sign may be written in another color.

Simple Problems

Introduce this section by giving simple problems orally in small groups. Example: there are 2 boys here and 3 boys there; how many boys are there altogether?

Write problems such as the following: 1 boy and 2 boys are _______ boys; 4 cats and 3 cats are ________ cats. NOTE: the numerals must be written in color at first, so that the child may select the essentials of the problem. Later the color cue may be dispensed with.

Many children can do arithmetic calculation far in advance of their reading. Do not introduce reading problems unless the child can read.

Add this point add the number names (words) to the chart shown as Figure 47; and perhaps extend the chart by using the numbers (symbols, dots, and words) from 7 to 10. Then write simple problems using number words instead of symbols. Example: two girls and four girls are six girls. NOTE: here again, the number words must be written in color at first. Let the child refer to the chart at all times.

Writing Numbers 1 to 50

Prepare papers lined off in 1-inch squares, 10 across and 5 down. Write the numbers from 1 to 10 across the top row, and the number 20 below the 10. Then have the child write in the missing numbers (11 to 19).

Continue by writing in the number 30 and having the child complete the row (21 to 29).

Continue in this manner to 50. Always have a chart available for the child's use if he needs it.

Adding to 10

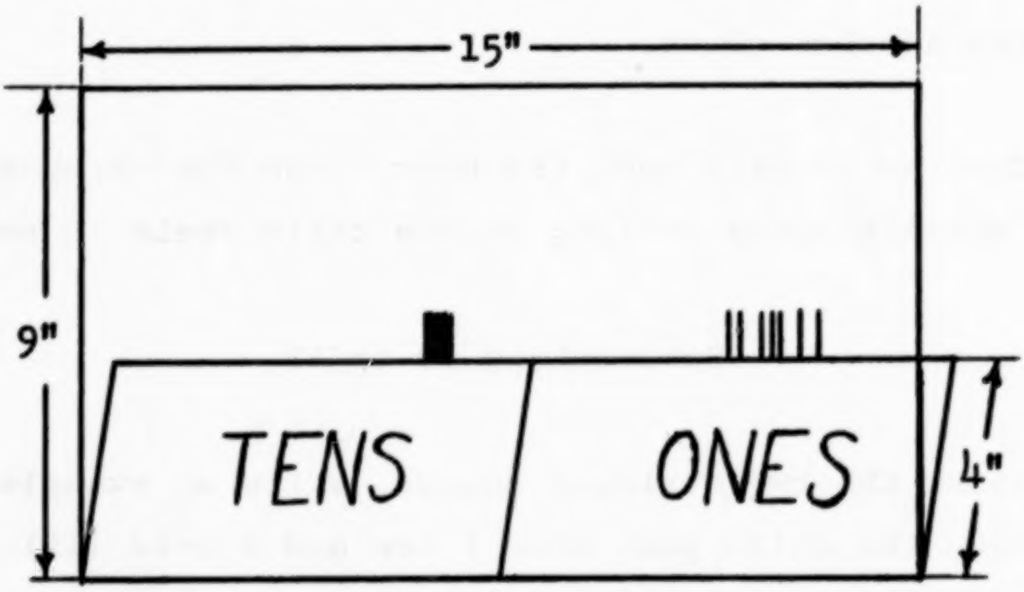
The child is now ready to use the abacus strung with 2 rows, each row in a different color. He should be very familiar with 10 by this time. First give the examples orally: have the child push over 5, then ask him to push over 7 (sometimes he will immediately say that he can't). Show him then how to use the 5 that are left in the first row and to use 2 from the second row. Then show him his answer and write the answer, saying as you write, "1 ten and 2 ones--12." Show him that the tens colomn is written under the add sign and that the ones are written under the ones column. Stay with this step until you are sure that the child can go further on his own.

A "tens pocket chart" may be prepared to help the child see the 1's and 10's better (see Figure 63). Here the child can readily see one bundle of tens in the tens pocket, and he can count the ones in the ones pocket.

Telling Time

Prepare a large clock face with movable hands of cardboard or paper plates (long hand red, and the short hand black as color cues). Make large pictures of clocks on paper, and

Tens Pocket Chart



Use wrapping paper 13 by 15 inches. Fold back 4 inches, making the pocket chart 9 by 15 inches. Staple the edges, and staple between the "Tens" and "Ones" pockets. The words on the face of the pocket should be written in color—a different color for each word. Colored counting sticks may be used singly and in bunches of ten.

Fig. 63

give one to the child. Have the child use the cardboard clock to set the hands at a specified hour. Then let him copy on his paper clock, with the use of a red and black crayon, the position of the hands. Do this many times, helping the child to see that the hour hand is short and the minute hand is long. Stay with the hour time until the child feels secure in telling the time (hour) from another clock.

Then go to half past the hour. Use the cardboard clock with the movable hands as long as the child feels it necessary.

Subtracting 10 to 19

Using the two stringed abacus, write an example on paper:

$$\begin{array}{r} 15 \\ -\ 8 \\ \hline \end{array}$$

Have the child push over 1 ten and 5 ones (15). From this number ask him to take away 8. He should know what makes 8. Using the 5 he adds 3 from the top row, he pushes these away, leaving 7 (when 3 are left your answer is 7). Go through several problems such as these before you leave the child to work alone.

When you feel that the child is secure in this process, make papers for him with examples.

Adding by 10's

The child is now ready for a 10 string abacus (100 beads) with each row in a different color.

Begin by asking the child to push over 1 ten, 2 tens, have him say 20, each to 100. Keep this on an oral basis for a time.

At the same time let him use this process in rote writing to 100 as a guide.

When you feel that he is ready you show him how to find the answer to the example: $\begin{array}{r} 11 \\ +12 \\ \hline \end{array}$ by first pushing over 1 ten and 1 one (11). There are 9 beads left on the second row. Use those 9 beads and 1 bead from the third row to make the second ten. Then push over 2 more to complete the 12. The child writes his answer 23 (the tens under the tens column and the ones under the ones column).

If this is too difficult a step, show the child how to add the ones column, then the tens column. Much of this will probably be done without the use of the abacus. However, do *not* take the abacus away from the child; let him discard it when he feels that he no longer needs it. This he will do of his own accord when he feels secure.

Two column addition--Here again show the child how to begin adding the ones column, then the tens column. At first have all the tens column with answers less than ten. Stress over and over that you begin adding the ones column first. Be sure you, as the teacher, call the tens column by its correct name at all times.

Learning About Money

This can best be done by using real money. Seeing and feeling the coins have great value. Have him close his eyes and see if they sound different. Have him close his eyes and see if he can arrange them by size--dime, penny, nickel.

Identify the names of coins, using real money (1. Penny; 2. Nickel; 3. Dime). Ask the child, "Give me 2 pennies," and so on. Show the child that a nickel is worth as much as 5 pennies, or you can buy as much with 5 pennies as with a nickel. Go slowly. This is a difficult concept for some.

Later say, "Give me 6 cents," and "1 penny and a nickel." The child needs to know what things he can buy for this amount of money. This is very important.

Many papers can be made at this point introducing the cent mark in another color from the examples. Stress the position of the "¢" mark in relation to the answer.

Counting by 5's

Here is a good place to begin counting by 5's--using nickels. Also, another 10 string abacus could be set up using a different color for each 5 on each row. After oral work the child can begin to write by 5's. If he needs the abacus to guide him, let him use it. This is a good place to make a "hundreds board," made as the "fiftys board" in the section, "Writing Numbers 1 to 50," above. Make each multiple of 5 in red. The child counts by 5's; but he must understand that each number on the clock face represents a group of 5 minutes (when the minute hand passes over them) as well as representing an hour.

Now he is ready to learn how to tell time with the quarter hour.

Measurements

At this point the child should be ready to learn about a ruler, and that 12 inches make a foot. The teacher may also be able to introduce liquid measurements in an elementary fashion: pints, quarts, and gallons.

Carrying in Addition

Occasionally a child will find this process is easy, especially if he has a good mental picture of the 10 string abacus and of 10. Other children find it very difficult, merely because if is something new to learn.

Write down an example: Remind the child to begin adding

$$\begin{array}{r} 36 \\ +47 \\ \hline \end{array}$$

the ones column first. Using the 10 string abacus the child pushes over 6. There are 4 beads left. He uses the 4 and adds as many as he needs from the next line to make 7. He sees 1 ten and 3 ones. Show him how to write the 3 ones under the ones column. Show him then that 1 ten is still left on the abacus (top row), and that he may write a small 1 above the 3 in the tens column. Then he adds the tens column, and he has his answer.

Go over several examples in this manner.

For some time let the child have only 1 ten to carry. Go very slowly. The important thing to remember is that the process must become stabilized to the extent that it becomes part of his thinking. Check each paper each day. Be sure that every example is correct before the child leaves the work.

Borrowing in Subtraction

Use the 10 string abacus. Write an example:

$$\begin{array}{r} 43 \\ -16 \\ \hline \end{array}$$

Show on the abacus that you cannot take a large number from a smaller number. Show him 3 and that you cannot take away 6. With your pencil show him how to borrow a ten from the tens column, thus changing the 4 to a 3 and making the 3 into a 13.

Arrange the combinations so that your first examples do not have the sum of 11 since this is confusing to the child (one ten and one 1 = 11).

Add and Check

By the time the child is ready to learn to check his own examples, this is an easy and comfortable process.

Write down an example:

$$\begin{array}{r} 243 \\ +232 \\ \hline \end{array}$$

Have the child add to find the sum. By this time he will perhaps proudly tell you that he doesn't need an abacus. Call attention to the number next to the add sign. Tell him to copy this number down under his answer, reminding him to copy number under number. Tell him to subtract to get his answer. Then show him that it is the same number as the one at the top of his example. (Some children will make this discovery for themselves!) Use only simple combinations at first, and defer carrying and borrowing until much later.

Subtract and Check

This process is essentially the same as that in the previous section, except that to check subtraction the child adds. Mix the problems so that the child will be able to transfer from one process to the other without difficulty.

Counting by 2's

Use the "hundreds board," made in the section, "Counting by 5's," above, but now write the odd numbers in blue and the even numbers in red. Have the child read the red numbers until he gets the feel of counting by 2's. The names odd and even are introduced here. Then give him a squared paper and let him fill in the numbers for himself. Start off with one line only, and then add more lines as soon as he is ready for them. He may discover for himself the possibility of skipping spaces and writing only the red numbers in their proper places. Another possibility is for the teacher to write in the blue (odd) numbers and then to let the child fill in the missing (red) numbers.

Dollar Sign and Decimal Point

Work papers may be made by writing the examples in blue and the decimal point and dollar sign in red. Show the child how to make the dollar sign, where it is put. Do the same for the decimal point.

After the child has learned to make the dollar sign, call out money numbers for him to write.

Later work papers may be made whereby he reads the number words and writes the amount of money indicated.

Written Problems

Written problems must be very simple at first. It is very important to use only vocabulary with which the child is familiar. This type of work is very difficult for him. Use the number symbols in the problems at first; later the number words may be used. Write the problems so simple at first that the child immediately knows what process to use. Gradually increase their level of difficulty. The child should be able to begin to organize and use what he has been taught.

Multiplication

Multiplication has a great psychological influence upon the child. There is a grown-up-ness about it. Further it is a dramatic moment when he discovers that multiplication is a quick way to do addition. The multiplication sign itself with its oblique lines means mastery over the difficulties of eye-hand coordination. By the time he has reached this stage, it is hoped that he no longer needs the abacus; let him use it, however, until he is ready to discard it.

Use of Abacus

Begin teaching very simple examples orally to show the child how to do it. Take for example: $\begin{array}{r} 2 \\ \times 3 \\ \hline \end{array}$ Have the child push over 3 groups of two; then 2 groups of three. Let him discover that 2 x 3 and 3 x 2 are the same. Do several examples such as this before you write one on paper for the child to work. Stay with him until he feels secure. Tell him to call you immediately if he needs help.

The Multiplication Board

Some children understand multiplication better if the multiplication board is used before the abacus. The multiplication board is made by using 2 pieces of heavy cardboard, 6 by 21 inches (see Figure 64). Cut six 2-inch windows in each piece as shown. The 2 large pieces are pasted together with strips of the cardboard between the windows and at each end so that the strips of tagboard can be moved. Now make 6 tagboard strips 2 by 18 inches. Mark off into 2-inch squares and make the dominoes as illustrated. Thread the board with the strips. The problems: 3 x 2 means to show 3 windows, each containing 2 dots.

Division

Use of Abacus

This is usually an easy process for most of the children. Begin by asking the child to push over a given number, e.g., "8." Then say to him, "How many 4's do you have?" He then groups the 8 into 2 fours. After several oral problems show him how to write a division example.

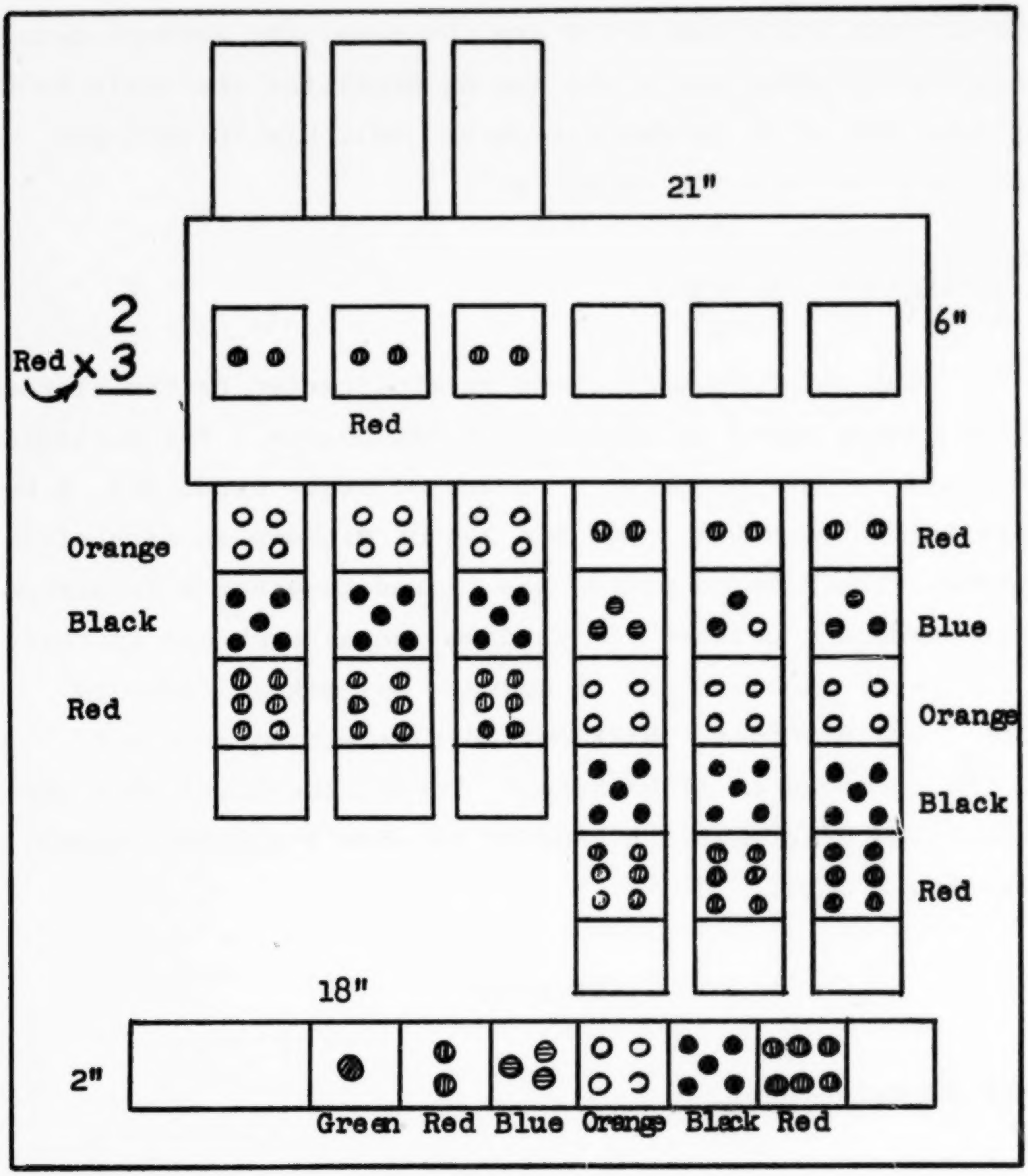
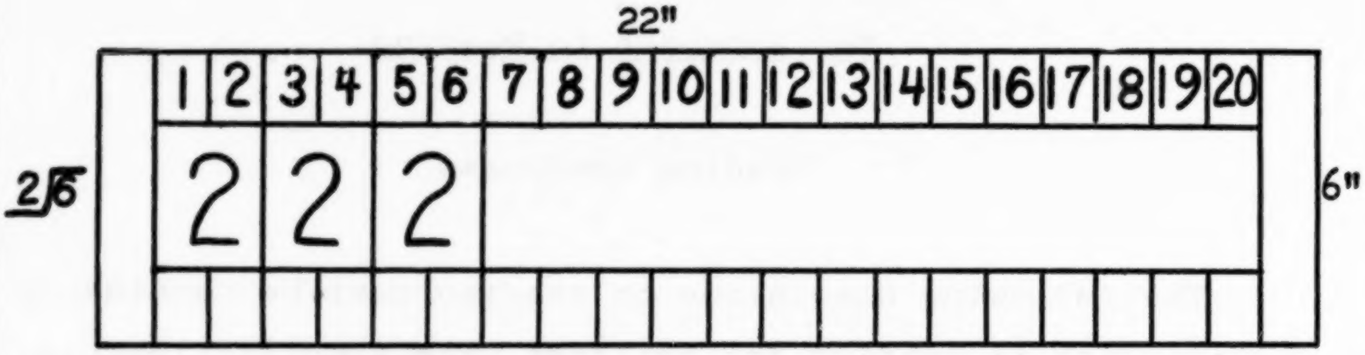

21"
6"
2
Red × 3
Red
Orange
Black
Red
Red
Blue
Orange
Black
Red
18"
2"
Green
Red
Blue
Orange
Black
Red

Fig. 64.--Multiplication board.

The Division Board

This useful device is made as follows: Cut a piece of heavy cardboard 6 by 22 inches (see Figure 65). Frame the board by pasting a 1 by 6-inch strip on each end and a 1 by 20-inch strip across the top and bottom. Mark the top strip into 1-inch squares and number from 1 to 20 in color. Now cut strips for the inside of the frame.



Division Board (violet numbers)

Fig. 65

20 strips	1 by 2 inches.	Write 1	on each of these.
10 strips	3 by 2 inches.	Write 2	on each of these.
7 strips	3 by 2 inches.	Write 3	on each of these.
5 strips	4 by 2 inches.	Write 4	on each of these.
4 strips	5 by 2 inches.	Write 5	on each of these.
3 strips	6 by 2 inches.	Write 6	on each of these.
2 strips	7 by 2 inches.	Write 7	on each of these.
2 strips	8 by 2 inches.	Write 8	on each of these.
2 strips	9 by 2 inches.	Write 9	on each of these.
2 strips	10 by 2 inches.	Write 10	on each of these.

To work the problem: $2\overline{)\ 6\ }$, put a pin on the line between 6 and 7 at the top of the board. See how many cards marked 2 will fit into that space.

By the time the child and teacher have reached this stage in arithmetic, the methods in the arithmetic texts will be usable. The teacher will have found her own devices for teaching concepts and can follow the regular course of study for further progress.

The Approach to Reading

Reading Readiness

The following discussion on reading must be considered as one approach to reading for children with specific learning disabilities. It cannot stand alone as a treatise on reading and should not be approached unless the full content of this monograph has been read and understood. Reading is presented last because everything else is, by and large, preparation for reading. Kirk (7) lists the following factors in development as necessary for reading readiness:

1. a mental age of 6 or more[1]
2. adequate language development required for reading
3. memory for sentences and ideas
4. visual memory and visual discrimination
5. auditory memory and discrimination

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[1] At the 1958 meeting of American Association for Mental Deficiency, Hegge recommended a mental age of 8 for beginning reading with retarded children.

6. correct enunciation and pronunciation
7. motor ability
8. visual maturity
9. motivation

Any authority on reading would list these factors and would add the matter of social adjustment and the ability to cope with the day-to-day class situation.

The Problem

When a child has difficulty in reading, the first task is to try to discover the reason. If, for example, he cannot distinguish a square from a triangle, he will not be able to tell A from H. If a picture of a swing and a picture of a table look the same to him, he cannot see the difference between M and W. If he cannot stack plates, saucers and cups, or does not know what size piece of paper will best fit on his desk, he needs help in organizing spatial relationships, for in reading he may confuse said-and, the-then, you-yes, on-no. If he cannot direct his attention to specific sounds or cannot differentiate between high and low, loud and soft, he needs help in sound discrimination. If he cannot follow a simple direction, such as "put the book on the table," cannot ask or answer a simple question, is unable to speak understandably, he needs help in speech and language development.

Still another problem he may have is seeing the whole picture. One teacher asked a child to identify the picture of a farm. The child's response was "cat." A very small cat was sitting on the ground by the barn. This is the type of child who will identify a word by one part of it. He will learn family, for example, and then call any word ending in y family.

Filling the gaps that can be found to exist within each successive stage of development is essential if the child is to learn to read. The techniques presented in this study are for the purpose of "filling the gaps" so that the child is ready for the reading process. The more he can do and learn by seeing, feeling, hearing and saying simultaneously, the greater his success in learning will be.

Many of the children in the study had had numerous failure experiences with reading; the presentation of a book for them to read would set off behavior reactions of aggression or withdrawal. Regardless of what grade they had come from or whether they were beginning, the same test procedures were used to find a point of beginning. As has been pointed out, the developmental lag or deviation had made function uneven. It is the goal in these procedures to get back to the basic tools necessary for reading and to build from there to the reading level. In the section on the instructional program these steps have been worked through very carefully. In looking toward the reading process, it may be well to ask questions that will aid in finding the right beginning point.

Visual Discrimination

1. Can he sort colors into groups?
2. Does he know the names of colors?

3. Can he sort forms? Can he put all of the squares in one group and all of the round forms in another? Can he do this even though the forms are of different sizes and colors?
4. Can he do this with more than two forms? Can he draw any or all of the forms from the teacher's example?
5. Does he know the names of the forms?
6. Does he associate any meaning with any of the forms? E.g., "This is round like a ball," or "Round-Ball."
7. Can he reproduce a pattern from a model such as a red square, a blue square, and a green square in a vertical row? Can he do this horizontally?
8. Can he sort letters as described earlier?
9. Can he match pictures?
10. Can he match words to words?
11. Can he match pictures with letters, sound and word?
12. Can he speak clearly and understandably?
13. Can he imitate sounds?
14. Can he repeat a sentence after you?
15. Can he pick out the beginning or ending sounds?

Language Development

1. Can he answer questions?
2. Does he seem to understand what is said to him?
3. Does he have an adequate basic vocabulary (the Dolch cards are suggested as a starting point)?

4. Can he keep to a subject or does he wander to irrelevant topics?
5. Is his language satisfactory for his age level?

Left-To-Right Progression

One sign of the developmental lag with children is the lack of established handedness. They are inclined to be ambidextrous and use one hand as well (or as poorly) as the other. This may account in part for the clumsiness described in earlier sections. Studies by Gesell, McCarthy, Karlin, and others have shown that there is a simultaneous development of higher mental functions, cerebral dominance, handedness and language development. Karlin found in his study that the more strongly handedness was developed the higher was the language ability. He found a positive correlation between the degree of brain development and the development of language and handedness.

Certainly in the area of reading and writing, the left-to-rightness is of utmost importance and requires specific training. This training needs to be started early and continued in every activity until well established. The purposes of training are:

1. to help determine and establish handedness,
2. to learn direction,
3. to gain a better self-image,
4. to match forms and words in correct sequence,
5. to help establish spatial relationships.

Techniques

Begin with the left hand, since it is left-to-right that must be established. Place the child's left hand on paper and have him trace around it with a black crayon (even if it is necessary to guide his hand). Tell him this is his left hand. Write the word "left" on the paper copy, as well as on the back of his hand with chalk. Follow the same procedure with his right hand. See if he can cut out the hand forms and match them to his hands. The goal is to see the form, and to match the form. If he needs help in cutting or tracing help him. He will say "left" and "right" with the teacher, repeat after her, and then do it by himself. Next have him trace his left hand on the blackboard with chalk, and later the right hand. Label the tracings "left" or "right".

While he is tracing one can get a clue as to which hand does the best tracing. This may show which hand he should use in writing. Talk about and take turns demonstrating left ear and right ear, side, and foot, and so on. (Be sure to face the same way as the child in these initial stages.) Help him know the left and right sides in tracing and writing; point out the fact that he starts at the left and goes to the right. A color cue is very helpful. Mark left with green and the stopping point with red. This is also a guide for him to follow and an aid in stopping.

Show pictures of left hand and right hand. Let him match them with his own. (Excellent hands in Look and Say, Teacher's Edition, World Book Company.) Ask him to show you his left hand, his right hand--help him if he has forgotten. Devise simple games, simple and not exciting; the goal is to learn left and right, not to play an exciting game.

Activities in motor training should be planned with establishing of dominance in mind. Sing "Looby Lou" and teach the proper motions, if this is not too exciting. Apply left and right to his immediate environment whenever possible. Setting the table is a good activity for learning left and right. The fork is on the left side; ask him to "put the fork on the left side." Teach him that, "The spoon is on the right side." Combine seeing, feeling, and doing, whenever possible.

Try as soon as possible to establish a definite purpose for one hand. "We salute the flag with our right hand." "We always shake hands with our right hand."

Keep making him consicous of left and right: ("The orange line is on the left side,") or testing ("On which side do you see the orange line?").

Visuo-Motor Training

The activities introduced here have their beginning in the perceptual training as outlined earlier. The steps that follow lead from those activities toward reading. Good form and color discrimination will have been developed before this part of the program is followed.

Using Forms and Shapes

Use paper geometric forms. The teacher puts a green square and a red circle on the child's desk which has nothing else on it, thus □○ Have him watch you do this. Now give him duplicate forms. Ask him to make the same design under the one already made. Be sure he knows the work "under." Guidance may be needed so that he will put the square on the left side and the circle on the right. Start working now for left to right progression.

Again use the squares and circles as above, but use all forms of the same color.

This time the teacher uses two green squares and one red circle to make a pattern, thus □○□ . The child is given duplicate forms and asked to duplicate the teacher's design under hers. Now use the same procedure, but vary shapes and colors, keeping two alike and one different. An added step is to tell which one is different.

Do the same exercise using a desk chart.

Give the child a similar exercise on ditto paper. Let him mark through the form that is different in each line. Then have him cut out the forms in the bottom line and paste them in the proper sequence in the spaces provided.

Go through the same steps as in the above paragraphs, but have the child now make the pattern to the right of the one he is copying.

Similar work may be found in reading readiness workbooks. Tear out such pages, cut in strips if necessary. Note: When the child is ready, increase the number of forms needed to make the designs, also the number of designs to be copied at one time.

Matching Pictures

Match pictures which are exactly alike. Start with a few pictures. Increase the number and the difficulty as the child can handle them. The Dolch Match-Me Picture cards are excellent. If the teacher feels that at this time the child needs more help in this type of work she may cut out clear pictures, mount them on tagboard for the child to match. Additional sets of picture cards should be made if necessary.

Matching letters

This step is for matching, not learning letter sounds or names. Begin with letters that are very different in forms, such as o and t. For example: On the first day take 2 t's and 2 o's. Put one o in one box and a t in the other. Give child the other o "Put this in the box that has one just like it." Then give the t and follow the same procedure. If he can do this, give him several of each and let him sort them himself. The desk pocket charts are good for this type of sorting.

Gradually work toward differences in letters with more similar forms. The following pairs of letters are quite dissimilar:

m - t
c - b
d - e
f - g
q - r
s - t
w - o
y - z
h - j
k - p
l - n
a - i

However, the letters listed below are difficult to differentiate and so would be matched last:

h - k
r - h
n - u
i - l
i - j
b - p
t - f
a - s
e - c
h - n
o - e
o - c
m - w
m - n
b - d
x - w

(Suggested materials to use: Beckly Cardy letters, letters from printing set or primary typewriter, plastic letters, letters cut from workbooks or advertisements, dittoed letters in blocks, dittoes in two rows for matching.)

Matching Words

Follow the same procedure as in "Matching Letters" above, using words. Begin with words of very different configuration, for example: ball - me; go - run; little - come. Make them more similar as skill develops. Use words with capitals.

Building Words

Give the child a desk chart with 3 or 4 word cards that are familiar to him. In a small box have only the letters needed to make these words. Guide the child in learning how to do this. Here the teacher stresses the left-to-right process. Caution: Do not allow the child to put the letters in the chart in any way other than the proper order.

Phonetic Training

At the same time the teacher is working with visual training, she gives definite instruction in auditory perception.

It is customary with normal children to begin ear training or phonics after a basic sight vocabulary is established; but for many of these children phonetic training is often the means of acquiring the first words of a reading vocabulary. It is necessary to have the all-sensory approach in order for them to organize the processes needed for reading. The children must be helped to realize that the symbols on the page represent speech sounds. They will learn the whole words if they understand how they are put together. The approach presented here has proven successful with the children in this study.

Ear Training

Techniques for listening suggested earlier are as basic to work on phonics as the eye-hand coordination exercises are for the visual approach to reading. In addition to listening the children must learn to imitate sounds.

Imitate the sound of a fire engine. Some children will have their own variety of fire engine. A prolonged *oo*--*oo*--*oo* going up and down makes a fine fire engine. Make it start far away, come close, and go away again.

The sound of an airplane can be an *m*-*m*-*m*.

A tea kettle, a leaky tire, a radiator, or a snake can be *s*-*s*-*s*-*s*.

A mad cat says *f*-*f*-*f*.

A goose says *th*-*th*-*th* (voiceless).

Sounds need not have animals or objects connected with them. "Let me see if you can make this sound: 'ee,' 'ah,' 'k,' 'o,' and so on." The purpose of this is to hear a sound and imitate it. Unless a child can give it back correctly, the hearing-speaking mechanism is not working correctly. If at all possible, correct the speech sound before putting it into the phonetic drill. Practice on the incorrect sound will only make its correction more difficult at a later date.

Correction of Defective Sounds

It is to be remembered that many articulation disorders are due to poor auditory perception. The child thinks he is saying the sound the right way. Test him to see if he can hear the error when you say the word the way he does. See if he can imitate the correct sound when you make it alone. For example, if the child says "tee" for "see." Try him on games that would make him say s-s-s. Play "right and wrong." "I am going to say some words. You be the teacher and tell me when I make a mistake." Show pictures of objects beginning with s. Say several the right way. Then make a mistake on a very familiar one as "taw" for "saw." "Is this a taw/" If he can hear the difference in someone else and can say the sound by itself, then the suggested procedures for phonetic training will be very helpful in correcting his speech.

Beginning Sounds

Show pictures of two objects that begin with m (preferably words that end with a distinctly different sound) such as milk and mop. Say them as you point to them, strongly emphasizing the beginning sound. Have the child repeat them. Show several more pictures that begin with the same sound. Be sure he understands about "beginning." In words such as moon and man there is the possibility of confusing the m and n; it is best to leave them until the m is well established.

Find the pictures that begin with the m sound from a set that the teacher gives to the child

Find pictures with this same m sound from magazines or old workbooks. Let the child cut out the pictures (outlined in black crayon, if necessary). Mount on paper. Each child might keep a book with his pictures.

By now the child probably can write the letter m saying the sound as he does so. Have him write it under each picture.

Give him three clear-cut pictures one of which does not begin with the m sound, and which has a distinctly different beginning sound as meat, cat, mouse. Ask the child to name each picture and to give the teacher the pictures that begin with m.

Give the child several pictures some of which begin with the m sound to work with by himself. Have him sort these putting all m words in one group, all others in another group.

Auditory and Visual Recognition Combined

Present the printed form of m. "You have learned to write m. Now I am going to show you how m looks in books and newspapers and magazines." Present different sizes, cut from a magazine, a printed card, from the print set. Let him stamp several m's with the print set, type some on the typewriter, select some from a box of mixed letters. Let him go back to his pictures under which he has written m, and stamp or paste a letter there. "Now you know two ways to make m. You can write it and you can print it." "This letter has a sound and a name. Its name is 'em.'" (At this point the teacher should be sure that the child is always presented with cursive or printed form--not manuscript.)

Put several pictures in the pocket chart, using one or two that do not begin with m. Have him put the letter beside the pictures that begin with m.

The "window chart"

See example and directions on the following page (Figure 66). Put pictures in pockets. The child uses a print set to stamp the appropriate letter in window or to place a printed letter in the window. As he learns to write he can write the sounds. Give him just the letters he needs to complete the activity.

Use the same general procedure in introducing each beginning consonant sound. Continue with each sound until the child seems ready to learn a new one. Go slowly, but do not risk boring him. If one sound seems too difficult, drop it for the time and try another one. The second sound and letter taught should be different in both sound and configuration. T is a good choice for a second sound because it satisfies both requirements and is easy for him to write. With the exception of m and n the voiceless consonants should be taken first. g,

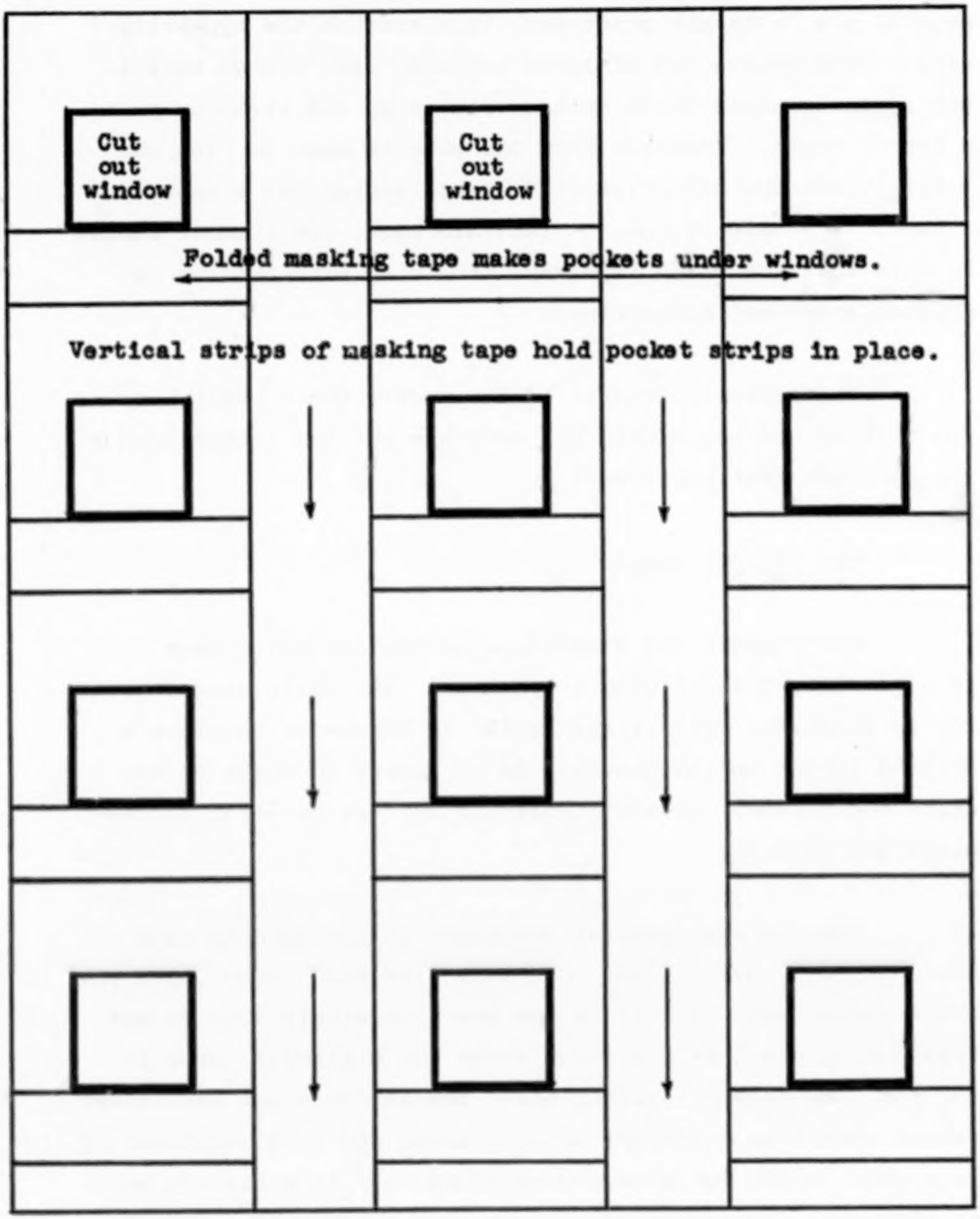

Cut out window
Cut out window
Folded masking tape makes pockets under windows.
Vertical strips of masking tape hold pocket strips in place.

Fig. 66.--Window Pocket Chart.

d, b, are best taught directly with short u as in duck, bus, gun. In presenting the diagraphs th, sh and ch, color will help the recognition that two letters represent one sound.

Final Consonants

If the beginning sounds are well established and associated with letter forms, the final consonants usually come easily and quickly. The techniques used for beginning consonants can be used for the finals also. Whether final consonants are taught before or after vowels is dependent upon the child's need. Many of these children are inclined to omit final consonants. Therefore, it is important that they learn to pronounce the final sound clearly; the visual symbol will do much to correct the speech pattern.

Vowels

After several consonant sounds are well established the introduction of one vowel sound makes it possible to begin building words. If one is following the procedure suggested in the section on writing, the short i would be the best one to use. This is limiting, because of the few picture words with three sounds that include the short i. The short-a "family" has many more possibilities: cat, rat, hat, bat, fat, and many other similar words exist.

Two pitfalls that may come with the usual approach to teaching vowels must be kept in mind:

Whereas most systems of teaching phonics use the short vowels first, it is well to remember that a child who is weak in auditory perception will have great difficulty in differentiating them. Short i and e are particularly difficult. Many words end in n or ng and these should be avoided until sound is set because the vowel blends into the nasal consonant (example: pin, pen, ring). The sounds a (as in hat) and o (as in hot) cause difficulty for some. Long vowels are easier to make and to hear.

Many of these children will find it very confusing to associate a sound with a specific object such as a as in apple. As in arithmetic one worked on the number concept to get twoness or threeness free of bunnies and cars, here it is important that the sound and its relationship to a symbol be established free of the distraction of pigs and apples.

As the child has learned to sound consonants when he sees the symbol, so he can learn the vowel sound. "This is the letter A and it says a." When this idea is set--"Now we can put some letters together." Use a different color for each letter.

1. Put down m and have him say it.
2. Put a after m and have him say m-m-a-a-.
3. Now add t. Point to each letter and say m-a-t.
4. Have the child do it with you.
5. When he seems sure of the sounds, have him do it alone.
6. Emphasize the fact that "We start at the left and go to the right."

Building Word Families

Dolch Picture-Word Cards are useful. Put picture word card in large chart rack. Build and sound the word for him as you place single letters in correct order beside picture-word card. Color for letters will help. Then let the child do it. When he is sure he knows how to do it, give him a similar exercise at his own desk, using a small desk chart. Put letters he will need in an envelope. When his work is checked he is to sound the letters into a word as he moves his finger from left to right. Other cards can be made. Paste pictures and print word on a small card and have a set of individual letters (Figure 67).

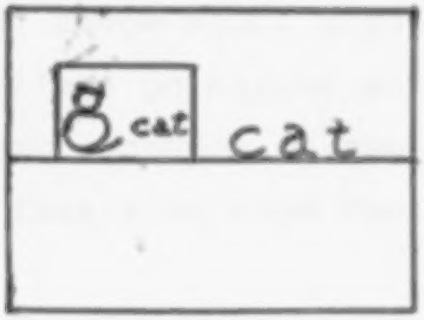


Fig. 67.

When he can do the first exercise successfully, replace picture word card with just the word printed on plain paper clipped to seat chart (Figure 68).

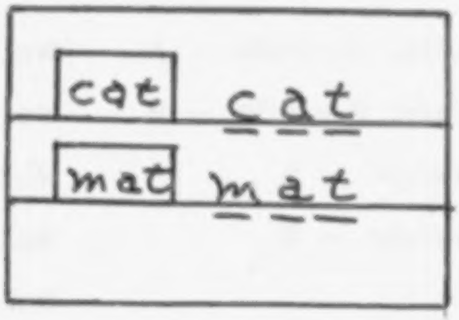


Fig. 68.

Use Dolch cards "Teaching Short Vowels," or make a set of flash cards of the word family needed. It helps to put the vowel in red, for example, C - t.

Adapt window cards to vowel sound.

Make a vowel sound booklet combining pictures and words.

Stay with one vowel sound until the child knows it well and can substitute many beginning and ending sounds, recognizing and saying each new word. In this word building procedure there is a close correlation between spelling and reading. He can soon learn to spell words he knows in word families. At this stage he learns to spell only those words that are spelled just the way they sound. In the beginning spelling is oral but when he can call the letter names in sequence without looking at the word he is getting excellent work in visual and auditory memory and recall.

For reinforcement and variety in practice on phonics the following filmstrips will be found valuable:

Title	Publisher
The New Spelling Goals	
Beginning Consonant Sounds - A	Webster Publishing Company
Beginning Consonant Sounds - B	Webster Publishing Company
Hearing Vowel Sounds - A	Webster Publishing Company
Hearing Vowel Sounds - B	Webster Publishing Company
Hearing Rhymes	Webster Publishing Company

Sight Words

Sight words are taught when needed. But the child's first attempt at seeing words in a sentence should be with as many words from "word families" as possible. The first sentence may contain just one word he can recognize with the teacher saying the rest of the words, e.g., "The cat is black." Teacher may say: "Find the word here you know. Put your finger under it. When it is time to say that word--you say it." Teacher reads, "the," child says, "cat", teacher says, "is black." She points to each word as she says it, and encourages the child to point to each word but only to say the word he knows. The accomplishment the child feels here may be his next cue that he can do something. A smile or "isn't this fun?" from the teacher gives support and encouragement.

First sight words might be color words (blue, orange, etc.), number words, and words needed to follow simple directions, such as the words, color, draw, and come. Color words and number words can be matched with object.

Language Development

Though there can be a time set aside for language development in the class, this is an ongoing process that is working every minute of the day. Directions are given clearly and carefully. Understanding of every object and every activity is kept in mind at all times. There are the "gaps" to fill and one must never take anything for granted; the teacher must be sure that each child understands what is expected of him and how to do it. This is training in language reception. It was noted in the psychological tests that many children failed on the subject of what things are made of, what things are used for. The inability to answer questions is a major problem with children who have difficulty in communication.

Games can be played in learning how to communicate and receive communication from others.

Make an action game for prepositions. Have children put an object in, on, under, beside, below, above, behind, the box. The teacher gives the direction first. When the children are skilled in following the directions, let them give the directions to each other. When the group can tolerate such activity, ask them to stand on a chair, lie under the desk, sit on the mat, hide behind the desk.

Make an action game for adverbs. Walk quickly, slowly, sadly, quietly, noisily, happily, and so on.

Make an action game for adjectives. Have a child bring the blue, red, big, little, striped, smooth, hard, soft, fuzzy ball, and so on. Have him pretend he is big, brave, little, happy, unhappy, kind, old, young, and so on.

Make an action game for verbs. Walk, run, hop, work, play, and so on.

Make a game for sentence structure. Give each child an object which he can hide in his hand or behind him. "What do you have?" He answers with a complete sentence: "I have a car." Let a child ask the question, for it is important that he know how to ask as well as answer; each child must get used to hearing different people ask questions. Use a shoe box with a peep hole cut in one end. Put an object in the box. "What do you see?" Answer: "I see a doll." Look through a paper tube or use the slide or film strip projector and have each child tell what he sees. Question the child: "What a boy can do?" A girl, a mother, a father, a dog, a truck, a tractor. "A boy can run" "A father can drive a car." Ask a child to cut some paper and keep cutting. "What is Billy doing?" "Billing is cutting." Work up many situations and use pictures for "What is__________ doing?" Hide objects around the room. Have one child hunt at a time. "What did you find?" "I found ______________."

Some children will need much work in this area. The sentences can get longer and more complicated. The question-answer technique, correct word order, clear speech and words that will appear in reading are being learned. Memory span is increased.

All games will be planned to have an instructional purpose for these children. "I Spy" is excellent. Card games such as "Go Fish" should have questions or answers to be used consistently. "May I have your fives?" Assign each child a question that is within his ability to say and hold him to it.

Reading Stories

Since the building of concepts is an important factor with these children, true life stories are important for them. Attention span is a factor to take into consideration in selection of story material. Following is a list of stories that have proven satisfactory:

Story Books	Author	Publisher
Stories To Begin On	Rhode Bacmeister	E. P. Dutton & Company
Come To the City Come To The Farm Come To The Zoo	Ruth M. Tensen	Bailey & Lee, 1951
The Cat In The Hat	Dr. Seuss	Random House, 1957
Littlest House	Elizabeth Coatsworth	Macmillan, 1940
True Book of Holidays	John Wallace Purcell	Children's Press, 1955
I Know A Story	Supplementary Primer	Row Peterson
On The Way To Storyland	The First Reader	Laidlaw Brothers
The Toy Train	A Golden Book	Simon & Schuster

Stories on filmstrip have been found to be especially useful with distractible children. The darkened room with one focal point of light will frequently hold the attention of a group when other devices fail. The following filmstrips are recommended:

Stories	
The Billy Goats Gruff	Curriculum Filmstrip Series
The Ugly Duckling	Curriculum Filmstrip Series
Cinderella	Curriculum Filmstrip Series
The Gingerbread Boy	Curriculum Filmstrip Series

Seasons	
Winter in Country and Town	Curriculum Filmstrip Series
Spring in Country and Town	Curriculum Filmstrip Series
Summer in Country and Town	Curriculum Filmstrip Series

The children learn to "tell" stories by arranging pictures in sequence. Many of the stories in readiness books can be cut out and pasted on spearate cards. The child learns to arrange in sequence and to say what comes first, what comes next, and so on. Later he may be encouraged to cut and paste a familiar story that he can use for "Share and Tell."

Chart Stories

After the child has acquired some skill with words, chart stories can be introduced. The purposes of chart stories are:

1. to show that there are symbols that represent verbal language,
2. to increase understanding of correct sequence of words in a left to right direction,
3. to record a unit of spoken thought,
4. to provide participation in a group activity,
5. to provide an opportunity to recognize familiar words in context.

Chart stories may begin with one sentence: "The ball is blue and red," or "The cat is on the mat."

Making or finding a representational picture to color, cut, and paste is valuable here to help expand memory for the sentence. More sentences can be added as seems appropriate to interest and attention span.

The First Book

When the child knows all of the words from the book he is to get; when he has established the process and reason for left to right progression; when he has a clear association between picture and object and understands the meaning of the words used; when he has a reasonably fluent speaking vocabulary; when he shows an interest in books and pretends to read or picks out words he does know--then he is ready for a book.

Here it is important that one know the child. The commercial book may be too distracting for some children. The book may need to be cut up so that he gets one short story at a time. It may be necessary to eliminate pictures. Some children will be able to use the book as it is intended to be used, following the teacher's manual. Let the child use his finger or a marker if he needs it. Accompanying workbooks should be used though they may need to be cut up.

Remedial Techniques

There are among these children those who appear to read well and rapidly. They are "word callers" who have no idea what they have read. Others may perseverate and say the same word or phrase over and over again, unable to proceed. These children will need "crutches" to help them slow down. Such devices as pointing to each word, marking between the words, making each word a different color, or using a frame to slide from word to word or phrase to phrase can be very helpful.

Exercises in following directions will make the child slow down and pay attention to the words he is reading.

The young child's early reading is naturally oral. The brain injured child is permitted to study his reading lesson by actually speaking in a low voice the words he is reading, or by articulating them subvocally. Silent reading is not emphasized until the child's oral reading is fluent and until his rate of reading begins to approach the rate of his speech. We have found that too early inhibition of peripheral movements of articulation distracts the child from arriving at the sense of thought of the material read. Also, speaking the words and hearing one's own voice contributes toward strengthening the necessary auditory-visual relationships.

Art

Purpose of Art in the Special Class

Although art is usually thought of as free expression, in this program for children with learning disabilities it will be considered as one more way to practice skills and understanding.

Goals

To develop visual perception, to develop motor control, to aid in the teaching of writing, reading and arithmetic, to establish spatial relationships and to help the child in his socialization with the group.

Planning the Art Lesson

The art lesson must be as carefully structured as other activities. The teacher must know what she wants to accomplish, how she will motivate the lesson and how to relate this activity to the children's needs and abilities. The room should be arranged so that the teacher can be close to all of the children at once. (This is a situation in which the trapezoidal tables can be used effectively.) All materials should be ready in advance with a systematic plan for distribution. A completed sample of what is to be done is before the children so that they can see the Gestalt before them at all times. A step by step procedure should be followed, with plans for cleaning up and putting away a part of the lesson. Gradually the children can be trained to get ready, work, and clean up with fewer controls.

Materials to be Avoided

Finger paint, wet clay and chalk have been found to create distracting situations. "Play-Doh" has been found a satisfactory substitute for clay.

Skills

Cutting

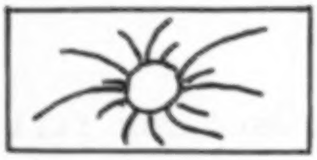
Cutting is an important skill for the child to develop because of importance in motor control and visuo-motor performance.

Pasting

Using individual jars of paste has been found to fit into the structured program better than giving out a small portion at a time. Pasting is a skill that should be taught step by step. Show the children how to open the jar, where to put the lid, how to dip the paste brush into the paste, how much paste to get on the brush, how to put paste on the paper, where to place the brush, how to turn the paper over, and so on.

Painting

Have paint mixed for the children and in containers that do not tip easily. Start with simple projects such as filling in a stencil. When the stencil is removed they can make such things as sun rays.



Suggested Art Projects

Use of Stencils and Patterns

Use forms such as the square, circle and diamond for interesting effects (Figure 69).

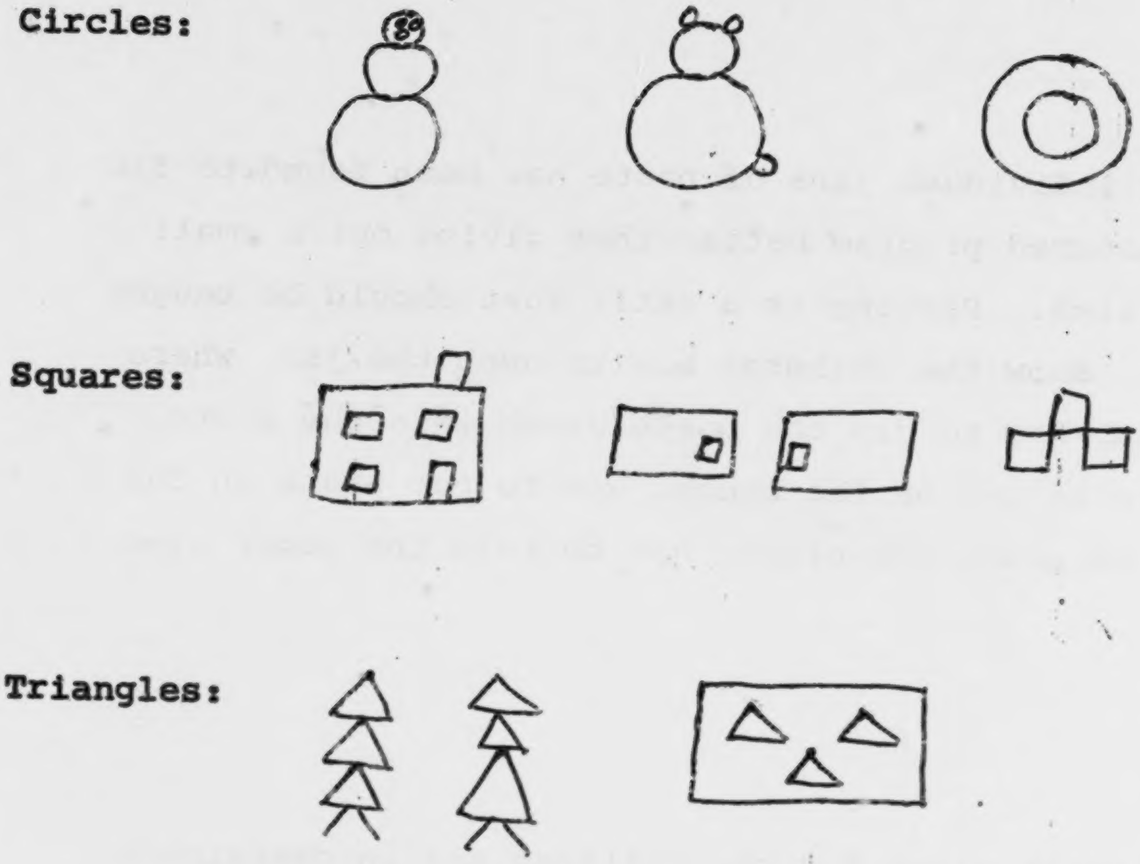

Circles:
Squares:
Triangles:

Fig. 69.

Color is used for filling in the forms. Start with one and work up to a combination, using first primary and then secondary colors.

Place mats can be made for use at the lunch period or in decorating for a party (Figure 70).

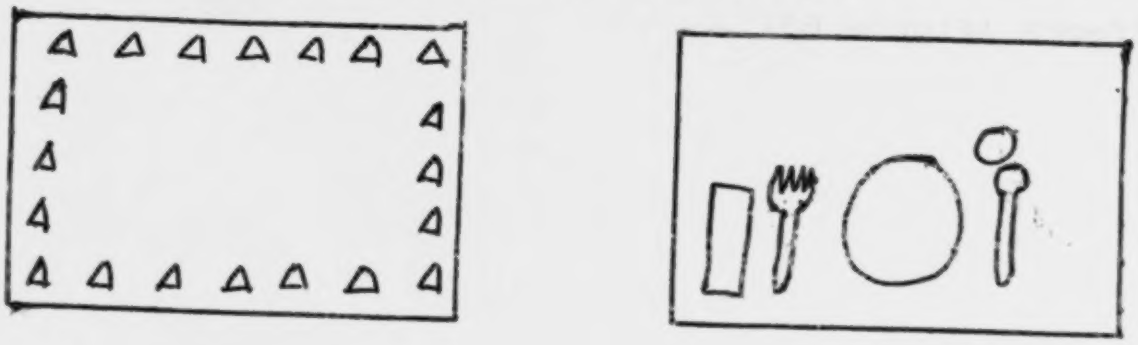


Fig. 70.

Stencils Used for Social Studies

For the holidays there are pumpkins, turkeys, bells, stars, hearts, and so on. A fine group project can be worked on at Christmas by making tree ornaments. Sketch an outline of a tree on the bulletin board in the hall. The children can put their ornaments on it with paste or thumbtacks.

Farm animals, houses, fruits, vegetables, jungle animals, and so on, can be used advantageously. Transportation and communication units lend themselves well to the use of stencils.

Stencils should have unbroken lines so that the child can see the Gestalt. Many commercial stencils are broken into sections and are not desirable for use with these children unless properly prepared (Figure 71).

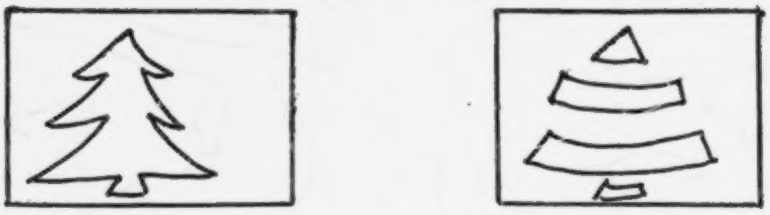


Fig. 71.

Murals

From the simple cutting and pasting rather complicated murals can be made. In a unit on "Travel to Nearby Places" a background of brown paper can be put on the bulletin board. Cut and paste the blue sky, white clouds, cars, busses, boats, telephone poles, people walking, and so on (Figure 72).

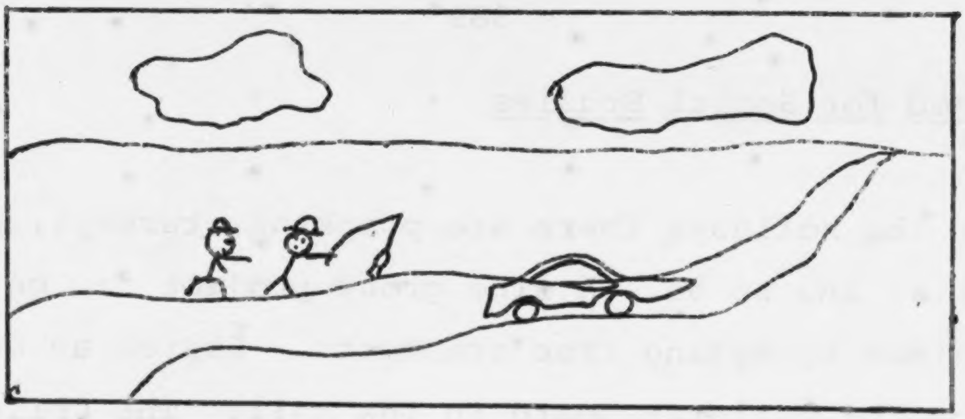


Fig. 72.

Science

Nature study offers endless ways of integrating the classroom program. The same type of bulletin board display as was described above for Christmas can be used in the fall to show change of color and falling of leaves (Figure 73).

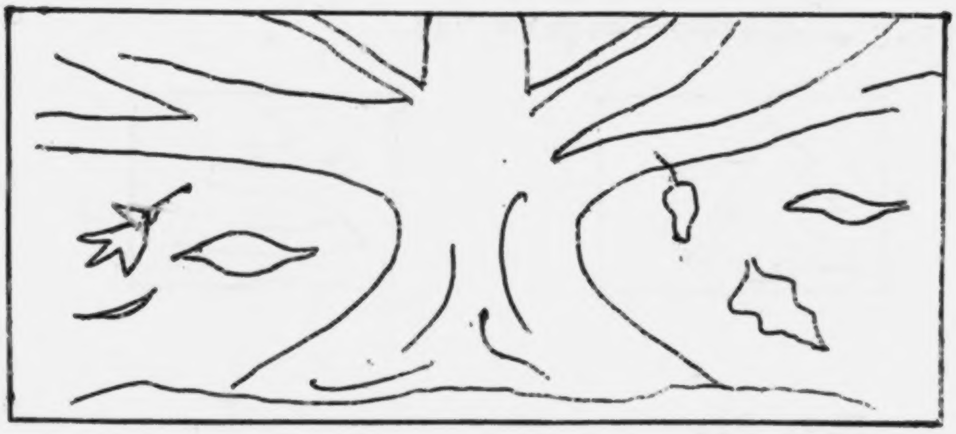
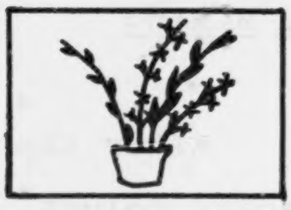


Fig. 73.

Use a simple leaf pattern (no veins), have children color (after observing trees outdoors) cut and paste or thumbtack.

In the spring bring in sprays of forsythia and pussy willows. Have the children observe that on the forsythia the



flowers are opposite each other, on the pussy willow they alternate. This leads into further study of growing plants, trees, and so on.

In studying animals have children observe animals in different positions. Then draw (stencil or free hand) (Figure 74).

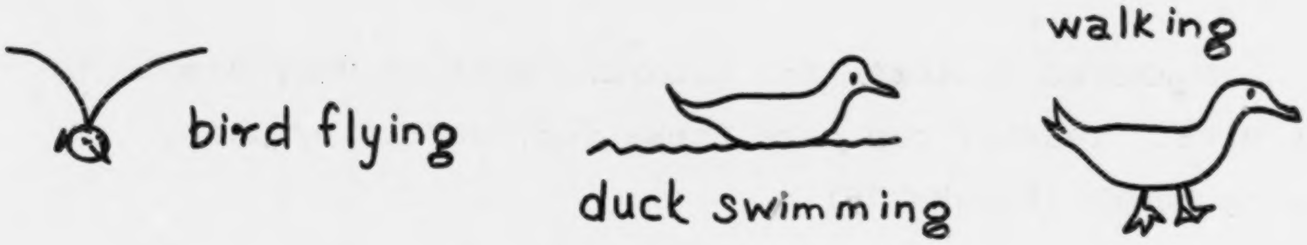


Fig. 74.

In motor training children can try to imitate, walk, and so on.

Crayon Technique

An interesting technique is to use the broad side of the crayon when drawing. It helps add depth to their work. Use crayons about 1 inch long (Figure 75).

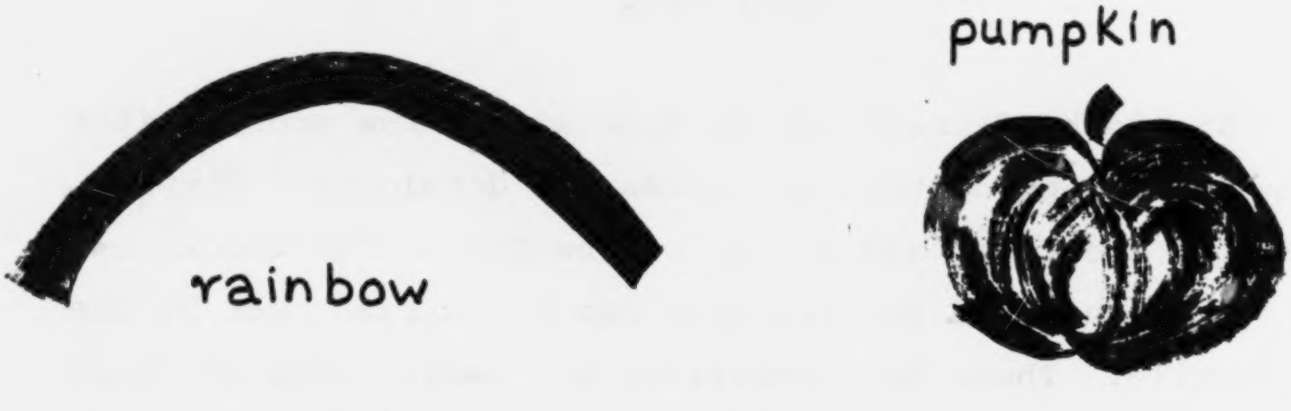


Fig. 75.

Color Mixing

After the children have learned the primary and secondary colors and used them in crayons and paint, color mixing is very interesting. Work first with the crayons and then the paints.

Numbered Pictures

Numbered pictures for coloring must be very simple to start with. Teacher can make these very easily by using coloring books (Figure 76).

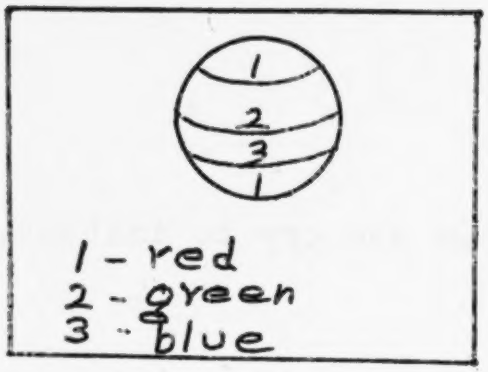


Fig. 76.

Handicraft

Simple handicraft can be done with these groups after their motor and perceptual abilities are developed. Simple woodworking, weaving, and so on, can be done. The block design technique used for training can be carried over by use of floor tile. These make beautiful hot pads. Odds and ends of tile can be found in the supply companies or can be bought as art supplies.

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CHAPTER VI

PSYCHOLOGICAL, EDUCATIONAL, AND PSYCHIATRIC EVALUATIONS

In the preceding chapters of this monograph problems of diagnosis, teacher selection, room treatment, teaching method, and other matters pertinent to the demonstration pilot study have thus far been discussed. It remains now to consider in detail the reactions of the children themselves to the educational program. It should be kept in mind that the children were under the described instructional program _for a maximum of ten months_. Not all children received this amount of school experience, since many began their school attendance later than others in keeping with the recommended program of individual child adjustment to the school. Vacations and illness also shortened the school experience for the children in varying amounts.

The children were carefully evaluated psychologically and psychiatrically at the beginning of the school year and at its close. Included in this chapter is a brief description of each of the psychological tests used as well as the administration and a brief description of the scoring techniques where appropriate. Included also is a second psychological post-evaluation completed twelve months after the close of the formal demonstration year. Finally, the psychiatric evaluations of the subjects made at the beginning and end of the demonstration year are discussed.

Psychological Instrumentation

The test battery consisted of 13 tests designed to investigate intelligence, social development, perceptual ability, readiness, and academic achievement. The pre-test period consisted of two phases:

1. screening battery, administered before grouping the children during the diagnostic period;
2. the remainder of the testing completed after the children were assigned to the research classes.

In the diagnostic phase the children were seen either at the school in which they were enrolled, or else they were brought to the psychologist's office by a parent.

The screening battery consisted of:

1. Terman-Merrill Revision of the Stanford-Binet Test, Form L
2. Goodenough Intelligence Test
3. Block Design and Coding subtests from the Wechsler Intelligence Scale for Children
4. Bender-Gestalt

After the diagnostic period was completed and the children class based, the remainder of the pre-test program was completed.

This consisted of:

1. Vineland Scale of Social Maturity
2. Ammons Full Range Picture Vocabulary Test
3. Marble Board Test
4. Tactual Motor Test

5. Syracuse Visual Figure Background Test
6. Rorschach
7. Metropolitan Readiness Test
8. Stanford Achievement Test

The choice of tests used in this study was determined by several considerations. The first factor was to evaluate the possible presence of organicity. To this end, tests were chosen which have been used extensively with brain injured children, especially cerebral palsied children, such as the Tactual Motor Test, Marble Board Test, and the Syracuse Visual Figure Background Test, the latter being a tachistoscopic test originally used by Strauss and Werner (59) and others (47), but greatly modified at Syracuse University. Two items chosen from the Wechsler Intelligence Scale for Children, the Block Design and Coding, have been frequently considered as being sensitive to the presence of organicity.

The second factor determining the choice of tests was the time available for testing. It was necessary to obtain as much information regarding the psychological functioning of the children as possible in the shortest possible time. The child was seen once during the diagnostic phase of the testing, and the time for testing was, approximately, from 45 minutes to 1.5 hours. Since many of the children were hyperactive, emotionally disturbed children, it was felt that this represented an absolute maximum of time for one testing session. Time was also an important consideration once the classes were grouped, and the academic experience for the children had started. The children were only in the classroom from 9:30 A.M. until 2:00 P.M. The children were primarily in school for an academic experience, not to serve as continuous subjects for psychological evaluation. The testing program, in short, had, by necessity, to be fit into the school program. The actual testing program was worked out with each individual teacher, who chose the child for testing on the basis of who would be least disturbed by leaving the room with the examiner for the psychological testing at that particular time.

Considering both time and the amount of information to be gained from a test, four tests used in the pre-testing period were discarded in the final, post-test period. These tests were the two items from the Wechsler Intelligence Scale for Children (Block Design and Coding), Tactual Motor Test, and Marble Board Test. It was felt that these tests contributed little additional information and merely duplicated the information obtained from other instruments.

The total post-test battery consisted of:

1. Stanford-Binet, Form M
2. Goodenough Intelligence Test
3. Vineland Scale of Social Maturity
4. Bender-Gestalt
5. Syracuse Visual Figure Background Test
6. Stanford Achievement Test
7. Rorschach

The post-test phase was composed of three separate testing sessions with each child:

1. the Stanford-Binet, Form M, administered during one session;
2. the Goodenough Intelligence Test, Bender-Gestalt, and Rorschach given during the second session;
3. the Syracuse Visual Figure Background Test.

Because of the special conditions which must be used with this latter test, i.e., darkened room and special equipment, a separate session was required. The Vineland Scale of Social Maturity involved a separate interview with the parent(s). The psychologist administered the Stanford Achievement Test during the pre-test phase, but the teachers assumed the responsibility for the post-test administration because of the short time available for testing.

Although post pre- and post-test Rorschachs were administered, the results have not been included in the present report. The Rorschach results will be published as a separate paper at a later date.

In the presentation that follows, a brief background for each test will be given, the administration and scoring described, and statistical results presented.

Stanford-Binet Scale

The choice of a psychological instrument for the evaluation of intelligence was quickly narrowed down to the two most currently used tests for this purpose: the Stanford-Binet and the Wechsler Intelligence Scale for Children.[1]

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[1] Referred to hereinafter as the WISC.

During the planning stages of this project, the main interest was in detection of central nervous system dysfunction in contrast to the children whose dysfunction appeared to be essentially emotional. It was generally agreed among the diagnostic staff that the determination of an intellectual level of functioning was in itself of little diagnostic value when considering brain injury per se. As Goldenberg has pointed out:

> Although there is a real problem in the choice of the most effective measures of intelligence for use with organic groups, this is more or less extraneous to the problem of detection of organicity (33, pp. 145-146).

Many authors (17, 19, 20, 22, 42, 44) have reported that brain injured children have intellectual ability well within the range of normal. Among many others, Benton and Collins (17) have pointed out that brain injured children show a selective impairment of intellectual functioning. In light of this selectivity of impairment, the use of general tests of intelligence as a diagnostic tool in the detection of brain injury has centered upon attempts to detect patterns of performance indicative of brain injury, and particular test items which might be of value for discriminating the effects of such impairment of intellectual functioning.

One reason for choosing the Stanford-Binet rather than the WISC is that there are relatively few studies (9, 62) in the literature reporting the use of the WISC with brain injured children. There are several such studies using the Stanford-Binet. Hopkins, Bice and Colton (40), and Cruickshank and Bice (23) have presented evidence showing the item difficulty on the Binet for cerebral palsied children. Although there was much variability in pass and failure percentages above the year III level, in general, failure was observed in items requiring judgment, discrimination, memory, visuo-motor abilities, and locomotion. The items receiving the largest percentages of passes involved language development.

Another factor making the choice of the Binet desirable for use in the present project was the fact that many of the children had been administered the Binet previously, either by a school psychologist or in a clinic contact. Thus, comparability of testing results in this project with previous testing was a consideration.

The Binet was not primarily constructed for the purpose of evaluating organicity, so most of the information concerning this use is by inference and empirically derived findings. Hoakley and Frazeur (39) compared matched groups of exogenous and endogenous retarded children on the Binet Scale. The only statistically significant differences found between the groups were on items requiring perceptual or visuo-motor performance, and this was especially true on the drawing of a diamond. It should be noted that Sarason (49) has called into question the diagnostic significance of this finding because none of the 15 pairs of children taking that item made equal scores.

In a group of 18 mentally defective children, Sarason (49) found that 9 subjects were completely unable to reproduce the diamond item on the Binet, and performance was very poor on other items requiring the reproduction of form relationships.

Frazeur and Hoakley (31) compared groups of exogenous and endogenous boys matched for CA and Binet IQ, for differences in performance on the Arthur Point Scale. The only significant differences found were on the Porteus Mazes, which distinguished the performance of the two groups at the .05 level of confidence.

Feifel (29) found that both children and adult cases of brain injury, as well as many psychotic patients, show a lower level of conceptualization in Stanford-Binet vocabulary definitions than do matched control subjects. Bijou and Werner (18), however, found that when exogenous and endogenous children were matched on MA and IQ, and when comparison was made on the Binet vocabulary test, the definitions of the brain injured were superior.

Although the use of the Binet as an instrument diagnostic of brain injury is open to some question, there is, nevertheless, research findings as indicated above to indicate that,

1. brain injured children do perform differently on at least some of the items,especially those requiring perceptual or visuo-motor performance;
2. there seems to be an order of item difficulty, at least for cerebral palsied children known to be brain injured.

Results

Table 13 shows the means, standard deviations, and t-test of the significance between means for the Stanford-Binet Intelligence Test IQ's pre-and post-test. It can be seen that there are no statistically significant differences between the

TABLE 13

MEAN IQ, STANDARD DEVIATIONS, t-TESTS, AND PROBABILITIES OF CHANCE DIFFERENCES IN MEANS FOR THE PRE- AND POST-TEST STANFORD-BINETS

Class	N	Pre-test		Post-test		t
		$\bar{X}$	σ	$\bar{X}$	σ	
C-1	10	80.20	11.58	80.00	14.16	.11
C-2	10	82.10	13.48	83.80	13.43	.62
E-1	10	78.00	14.13	75.30	13.00	1.36
E-2	9	81.33	14.89	82.00	14.61	.33
Total	39	80.39	13.63	80.23	14.16	.14

pre-test and post-test means, either for the group as a whole, or broken down into a comparison of the four individual groups.[1] This is, of course, what is expected on the basis of a careful screening and matching of the children. As a further check on the comparability of the groups, an analysis of variance was done on the pre-test IQ scores, post-test scores, and the differences between the pre- and post-test scores. No significant F values were obtained.

Table 14 shows the comparison of Stanford-Binet IQ scores for the control and experimental groups. This was done as a further check on the possibility of differential growth taking place in the experimental groups as compared to the control groups. As can be seen from the table, no statistically significant differences were observed.

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[1] The accepted statistical significance level in this report is the .05 level. In the report and discussion which follows, only figures at this level are considered significant. The .10 level is reported as "approaching significance."

TABLE 14

MEAN IQ, STANDARD DEVIATIONS, t-TESTS, AND PROBABILITIES OF CHANCE DIFFERENCES IN MEANS FOR THE CONTROL AND EXPERIMENTAL GROUPS ON THE STANFORD-BINET INTELLIGENCE TEST

Group	N	$\bar{X}$	σ	*t*
Combined Control Groups, Pre-test	20	81.15	12.60	
Combined Experimental Groups, Pre-test	19	79.58	14.59	.35
Combined Control Groups, Post-test	20	81.90	13.93	
Combined Experimental Groups, Post-test	19	78.47	14.19	.74
Comparison of Control Group, Pre-test, and Control Group, Post-test	20	.75	7.51	.44[a]
Comparison of Experimental Group, Pre-test, and Experimental Group, Post-test	19	.58	4.56	.05[a]

[a] All *t*-tests in this chapter computed on basis of paired observations. The mean and standard deviation reported are based on the differences between pairs of observations, according to the formula given in Allen L. Edwards, *Experimental Design in Psychological Research* (New York: Rinehart and Company, Inc., 1950), p. 150.

In considering the age range of the Stanford-Binets in reference to the grouping of the children, it was noticed that there seemed to be a narrowing of the age range over the course of the year. It was felt that there might be a "consolidation" of ability, that as a result of the year's experience performance at the lower levels of the scale had been brought more nearly into line with the child's potential ability. Table 15 shows the means, standard deviation, and *t*-tests of significance between means for the age range on the pre- and post-test Standord-Binets. When considered by classes, there were no differences, but as a total group the age range was significantly less ($p < .05$) at the end of the school year. To check on whether or not there were systematic changes in age range, comparison was made between the experimental and control groups, and the results are shown in Table 16. No significant differences were found in this analysis.

TABLE 15

MEANS, STANDARD DEVIATIONS, AND PROBABILITIES OF CHANCE DIFFERENCES IN THE MEANS FOR THE AGE RANGE FOR THE PRE- AND POST- STANFORD-BINETS

Class	N	Pre-test		Post-test		*t*
		$\bar{X}$	σ	$\bar{X}$	σ	
C-1	10	5.30	1.49	5.10	1.58	.41
C-2	10	5.30	1.27	4.30	1.74	1.72
E-1	10	5.40	.92	4.80	.75	1.59
E-2	9	5.11	1.45	4.66	1.15	1.28
Total	39	5.28	1.30	4.72	1.40	2.39*

*$p < .05$

Although there are some differences between the order of difficulty found in the present study and that reported by Cruickshank and Bice (23), the same general types of difficulty may be seen, i.e., those items are most difficult that require visuo-motor ability (drawing a diamond, copying a bead chain), followed by items involving memory, judgment, and discrimination.

TABLE 16

MEANS, STANDARD DEVIATIONS, t-TESTS, AND PROBABILITIES OF CHANCE DIFFERENCES IN MEANS FOR THE CONTROL AND EXPERIMENTAL GROUPS ON THE STANFORD-BINET AGE RANGE

Group	N	$\overline{X}$	σ	t
Combined Control Groups, Pre-test	20	5.30	1.38	
Combined Experimental Groups, Pre-test	19	5.26	1.21	.09
Combined Control Groups, Post-test	20	4.70	1.71	
Combined Experimental Groups, Post-test	19	4.74	.96	.09
Comparison of Control Group, Pre-test, and Control Group, Post-test	20	.60	1.74	1.50
Comparison of Experimental Group, Pre-test, and Experimental Group, Post-test	19	.53	1.09	.65

The most difficult single item was the drawing of a diamond. Only 7 out of the 39 children were able to draw a diamond which met the Binet scoring criteria. The mean age of these 7 children was 8-7, and the mean IQ was 93.71. For comparison, the mean age for all the project children was 8-3, and the mean IQ was 80.39. Of the 7 children able to draw a diamond, one had been diagnosed as having definite neurological involvement. It is also of interest to note that of these 7 children, 4 had abnormal electroencephalograms; and 3, normal.

In summarizing the stanford-Binet test results, it can be stated that the project children did not show significant changes in IQ over the course of the year. The total group showed a significant narrowing of the age range when comparison was made of the pre-test (Form L) and post-test (Form M) results but there were no differences between the children in stimulus-free classrooms and those in regular classrooms.

Goodenough Intelligence Test

The Goodenough test is a widely used clinical test in working with children. Bender (13) has stressed the importance of this test in evaluating post-encephalitic and brain injured children. One important diagnostic clue emphasized by her is the discrepancy between the Goodenough MA and the Binet MA, i.e., she considers a Goodenough mental age as being highly suggestive of organicity.

Benton and Collins (17) consider the Goodenough as contributing to the diagnosis and detection of brain injury in about 50 percent of the cases, but have not offered controlled observations or data to support this contention.

While the influence of brain pathology may be sufficient in many cases to lead to poor performance on this test, other authors notably Machover (44) have shown that poor performance may be found in conditions of psychosis or neurosis, or other emotionally based conflict states. Goldberg (32) found that while normals tend to produce the best drawings, and organics the poorest, there is a great deal of overlap of performance of various psychiatric groups.

Goodenough and Harris (35) have reviewed the studies dealing with reliability, scorer agreement, and test-retest stability, and have shown that these aspects of the test meet the usual requirements set up for good clinical tests.

Goldenberg concluded his review of the literature as follows:

> The Goodenough test has not yet been established as having a sufficient validity as a discriminator of brain injury in children to justify its general clinical use for this purpose (33, p. 159).

The Goodenough test was included in the present battery as an additional source of information regarding the intellectual and perceptual functioning of these children, not as a test for discriminating the presence or absence of brain injury. Its inclusion could be justified as a rapport-gaining device, if nothing else. All of the children, with the exception of one, seemed to enjoy "drawing a man," and looked upon this activity as a game.

Administration and Scoring

The pre-test drawings were included as part of the diagnostic battery. Administration and scoring were according to the directions given by Goodenough (35).

The child was seated at a desk on which there were several sheets of 8 1/2 by 11-inch paper, a pencil and an eraser. He was told: "I would like you to draw a picture of a whole man for me. Take your time and make it the best picture of a man that you can possibly draw." Any questions that were asked by the child as to how his drawing should be made were referred back to his judgment. Any spontaneous remarks made by the child were recorded.

The drawing was scored by the examiner as soon as possible after the administration according to the Goodenough criteria. In the present study, two judges independently scored all of the pre-test Goodenough tests, and then the obtained IQ's were correlated. The Pearson product moment correlation coefficient was .91. Then the two judges went through all the scorings and, through discussion, arrived at a decision in the few instances where there was a discrepancy. In no case was ahere difficulty in resolving a scoring problem.

Results

Table 17 shows the means, standard deviations, and _t_-tests of the significance of differences between means for the Goodenough IQ's. IQ's, rather than MA's, were used because

TABLE 17

MEAN IQ's, STANDARD DEVIATIONS, AND PROBABILITIES OF CHANCE DIFFERENCES IN MEANS FOR THE PRE- AND POST-TEST GOODENOUGH INTELLIGENCE TESTS

Class	N	Pre-test		Post-test		_t_
		$\bar{X}$	σ	$\bar{X}$	σ	
C-1	10	79.50	20.48	85.30	9.92	1.27
C-2	10	73.20	13.92	75.50	11.80	.50
E-1	10	72.10	11.00	76.50	16.13	1.22
E-2	9	85.57	12.51	75.00	10.21	2.95****
Total	39	77.39	15.84	78.15	13.02	.10

$^{****}p < .02$

interest was in the *rate* of development. As can be seen from the table, three of the four classes made small, non-significant gains in IQ over the course of the year. The one exception (Class E-2) made significantly lower average Goodenough IQ's at the end of the year ($p < .02$).

Table 18 shows comparison of the combined control groups with the combined experimental groups. As can be seen, there were no significant differences either comparing the control with experimental groups, or in comparing the control groups, pre- and post-test, or the experimental groups, pre- and post-test.

TABLE 18

MEANS, STANDARD DEVIATIONS, *t*-TESTS, AND PROBABILITIES OF CHANCE DIFFERENCES IN MEANS FOR THE CONTROL AND EXPERIMENTAL GROUPS ON THE GOODENOUGH INTELLIGENCE TEST IQ SCORES

Group	N	$\bar{X}$	σ	*t*
Combined Control Groups Pre-test	20	76.35	17.79	.41
Combined Experimental Groups, Pre-test	19	78.47	13.53	
Combined Control Groups, Post-test	20	80.40	11.95	1.09
Combined Experimental Groups, Post-test	19	75.79	13.67	
Comparison of Control Groups, Pre-test, and Control Groups, Post-test	20	4.05	14.65	1.21
Comparison of Experimental Groups, Pre-test, and Experimental Groups, Post-test	19	2.37	13.43	.75

The above data show no differences between the experimental classes and control classes. It is of interest to note, however, that in the pre-testing only one child pictured a man "doing something." None gave spontaneous secondary elaborations or descriptions. In the post-testing, however, 15 children (38 percent) either had their drawing of a man "doing something," or else gave a number of secondary elaborations, i.e., "A janitor," "I drew a cowboy, with a gun," "He's wearing a striped shirt," "He's sitting down at a table, on a mat," etc. Of these latter 15 children, 9 were in the stimulus-free classrooms and 6 were in the control classrooms.

Ammons Full Range Picture Vocabulary Test

Decision was made to include the Ammons Full Range Picture Vocabulary Test[1] in the pre-test psychological battery because no reading, writing or speech is required of the testee. This was especially desirable in view of the severe speech difficulties of some of the children. In the FRPV, the child is required to point, and no spoken language is necessary.

Norms for the FRPV were established on a population carefully controlled for age, sex, grade placement in school, and occupation of father, and has been reported in a series of articles by Ammons and others (2, 3, 4, 5, 6).

Reliability is uniformly high, ranging for various groups from .86 to .99. Validity has also been shown to be, in general, quite good. Pearson product moment correlation coefficients have been reported for the following: .76 with Stanford-Binet for 60 male mental defectives (53), .82 with Wechsler Intelligence Scale for Children for 90 child reading cases (54), .78 with Leiter International Performance Scale for 50 cerebral palsied (41), .85 with full Binet for 120 preschool children (3), and .88 with Binet Vocabulary for 71 rural children (5).

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[1] Referred to hereinafter as the FRPV.

The FRPV was not included in the post-test battery for two reasons. First, the test did not contribute enough additional data. Its high correlation with the Stanford-Binet, Form L, in the present study was .83, which shows that the test measures essentially the same thing as the Stanford-Binet, and so can be used advantageously as a quick estimate of general intellectual functioning. Secondly, and related to the first, was the matter of time. It was necessary to administer the entire test battery to all of the children in approximately one month, and so an attempt was made to obtain as much meaningful information as possible in the shortest possible time.

Administration and Scoring

The FRPV consists of 16 cards, on each of which appear 4 cartoon-like line drawings. The examiner has an answer sheet on which the words to be used with each card appear. The child is asked which one of 4 drawings best represents a particular word, and responds by pointing to each drawing. Each response is checked right or wrong. Mental ages from 2 years through 16, and adult percentiles are available.

Results

Table 19 shows the means and standard deviations for the mental ages on the FRPV. Comparison of the two combined control groups with the two combined experimental groups does not show a significant difference between the means.

TABLE 19

MEAN MENTAL AGES AND STANDARD DEVIATIONS FOR THE AMMONS FULL RANGE PICTURE VOCABULARY TEST, FORM A

Group	N	$\overline{X}$	σ
C-1	9	102.56	21.99
C-2	10	90.00	16.76
E-1	7	91.57	19.62
E-2	9	100.00	27.71
Total	35	96.11	22.55

The above results show that at the beginning of the present project, the children in stimulus-free environments were quite similar to the children in control classrooms in their FRPV mental ages. These results are consistent with the findings on the Stanford-Binet and Goodenough Intelligence Test results reported earlier, which showed that the four classes were quite comparable in regard to their intellectual functioning.

Block Design and Coding from WISC

Tests involving block designs have been included in a number of tests of general ability (56), as well as tests designed to evaluate impairment of the abstract attitude (34). The value of this type test in diagnostic work with children rests largely on uncontrolled clinical observation, and on studies of mentally defective children.

Decision was made to include the Block Design and Coding subtests from the WISC because it was felt that they might provide additional information as to the types of learning problems manifested by the children in this project.

Results

Table 20 gives the test age means and standard deviations for the WISC subtest Block Design. Comparison of the means of

TABLE 20

MEAN TEST AGES AND STANDARD DEVIATIONS FOR THE WECHSLER INTELLIGENCE SCALE FOR CHILDREN SUBTEST "BLOCK DESIGN"

Group	N	$\overline{X}$	σ
C-1	10	73.60	12.32
C-2	10	79.20	23.94
E-1	10	62.80	9.77
E-2	9	76.67	12.65
Total	39	72.97	17.41

the combined experimental and combined control groups resulted in a t-test of 1.03, which does not reach the level of significance accepted for this study.

Table 21 gives the test age means and standard deviations for the WISC subtest Coding. A t-test of the significance of the differences between the means of the combined experimental and combined control groups was not significant (t = .083).

TABLE 21

MEAN TEST AGES AND STANDARD DEVIATIONS FOR THE WECHSLER INTELLIGENCE SCALE FOR CHILDREN SUBTEST "CODING"

Group	N	$\overline{X}$	σ
C-1	10	80.00	20.71
C-2	10	74.80	19.90
E-1	10	68.80	12.27
E-2	9	79.33	15.39
Total	39	75.64	18.19

The above results reflect the careful matching of the children at the beginning of the academic year. The control and experimental groups were equal in the types of ability called for in the Block Design and Coding subtests.

Metropolitan Readiness Test

The Metropolitan Readiness Test, Form R, was administered to all 39 of the children at the beginning of the academic year by the staff psychologist. The test is devised to measure the traits and achievements of school beginners that contribute to their readiness for first grade instruction. It is designed to be administered at the end of the kindergarten year or the beginning of the first grade. As it was noted that many of the children who would chronologically be far too advanced for this test were,nevertheless, unable to do many of the things required for satisfactory completion of it, it was decided to administer the test routinely to all of the children.

The Metropolitan Readiness Test is composed of six subtests: word meaning sentences, information, matching, number, and copying. The first four subtests (word meaning, sentences, information and matching) are grouped together to give a reading readiness estimate, test 5 (number) is considered the number readiness test, and all six subtests are summed to give a total readiness estimate. Descriptions of the six subtests follow:

Subtest 1--Word Meaning

Understanding and comprehension are involved in this subtest, not the child's language usage. In each row of four pictures, the task of the child is to select the one that illustrates the word the examiner uses.

Subtest 2--Sentences

This test is similar to subtest 1. Comprehension of phrases and sentences is required rather than single words. Successful performance on this test requires more sustained attention.

Subtest 3--Information

This subtest is related to vocabulary. From a row of four pictures, the child is required to select the one that best suits the examiner's description.

Subtest 4--Matching

This is a test of visual perception, involving the recognition of similarities. Each item contains four different pictures of animals, figures, objects, words or letters. In the center of the row, there is a picture with a frame around it just like one of the other four. The child is to locate the picture that looks just like the one with a frame around it, and indicate his choice by circling it.

Subtest 5--Numbers

This involves ordinal numbers, recognition of fractional parts, recognition of forms, time and number vocabulary.

Subtest 6--Copying

This test involves visual perception and motor control. Geometric forms and letters are the stimulus figures. Much the same type of activity is called for in this subtest as is required in the Bender-Gestalt.

In the manual of directions distributed with the test booklets, note is made that groups larger than 15 pupils are not recommended, and that smaller groups are even more desirable. Because of the distractibility of the children, each examination was administered individually. Careful attention was given to the directions, and in no instance was a departure from the directions made. The tests were carefully timed and no help, other than that explicitly stated in the directions, was given. Insofar as possible the individual tests were given in as non-stimulating a room as the schools could provide. An attempt was made to obtain as accurate an estimate of the readiness ability of the child as possible.

Results

Table 22 gives the means and standard deviations for each of the subtests of the Metropolitan Readiness Test. Table 23 gives a comparison of the combined control and combined experimental groups. As can be seen, there was no statistically significant differences between the groups on any of the subtests.

These results show that all of the four classes were very evenly matched in regard to their initial readiness, as measured by the Metropolitan Readiness Test.

Tactual Motor Test

This test was originally devised by Strauss and Werner (59) to test perceptual ability in the tactual sense modality. The task is for a subject, while blindfolded, to feel a board which has a raised design on it, and then to indicate his perception of the design by drawing it on paper provided for that purpose. Several variations have been used. In the present study, it was decided not to blindfold the children because of

TABLE 22

MEANS AND STANDARD DEVIATIONS FOR THE METROPOLITAN READINESS TESTS
(N = 39)

Test	Group									
	C-1		C-2		E-1		E-2		Total	
	$\overline{X}$	σ	$\overline{X}$	σ	$\overline{X}$	σ	$\overline{X}$	σ	$\overline{X}$	σ
Word Meaning	16.70	1.55	17.50	.81	16.80	.20	17.00	1.76	17.00	1.63
Sentences	10.50	2.38	11.10	1.70	10.60	2.97	10.00	2.94	10.56	2.57
Information	12.80	1.25	12.80	1.47	11.90	1.38	12.11	1.66	12.41	1.50
Matching	14.50	2.34	14.20	3.54	12.40	4.98	14.11	3.18	13.80	3.74
Numbers	16.60	6.39	17.30	4.69	15.30	4.65	18.33	5.03	16.85	5.36
Copying	6.20	2.52	6.70	2.45	5.10	2.62	5.00	2.87	5.77	2.98
Percentile Rank	65.00	31.19	69.00	26.39	56.10	30.56	63.79	30.99	63.46	30.23

TABLE 23

MEANS, STANDARD DEVIATIONS, t-TESTS, AND PROBABILITIES OF CHANCE DIFFERENCES IN MEANS FOR THE COMBINED CONTROL AND EXPERIMENTAL GROUPS ON THE METROPOLITAN READINESS TEST, PRE-TEST (N = 39)

Sub-test	Combined Groups				t
	Control		Experimental		
	$\overline{X}$	σ	$\overline{X}$	σ	
Word Meaning	17.10	1.30	16.89	1.92	.39
Sentences	10.80	2.09	10.32	2.94	.57
Information	12.80	1.36	12.00	1.52	1.69
Matching	14.35	3.00	13.94	3.06	.41
Numbers	16.95	5.62	16.74	5.07	.12
Copying	6.45	3.04	5.05	2.74	1.47
Percentile Rank	67.00	28.96	59.74	31.08	.74

the possible fear this might cause. Instead, a screen was used through which the child extended his two hands. In no case did a child experience observable anxiety at this procedure. Several children became curious and wanted to look behind the screen, but were easily discouraged from doing so.

Strauss and Werner used this test initially to determine the negative effects of background on the perception of form when the avenue of stimulation was through touch rather than sight. They found that when simple figures were presented as solid forms, both brain injured and non-brain injured, retarded children were able to reproduce them without difficulty. When the designs were constructed of rubber thumbtacks over a thumbtack background, however, the non-brain injured children showed definitely superior performance. Dolphin (28) and Shaw (50) obtained similar results using cerebral palsied and idiopathic epileptic groups.

For a detailed duscussion of this test and its administration, see Cruickshank, Bice and Wallen (24). Suffice it here to say that the three designs used were a triangle and Figures 4 and 6 of the Bender-Gestalt Test. The three designs were first presented without a background, and then were presented as raised figures against a background of thumbtacks.

Administration and Scoring

Three designs were chosen from those used by Cruickshank, Bice and Wallen. Each design was made of rubber-headed tacks, each appearing on two boards, one with a plain background and the other with a structured thumbtack background. The designs used were a triangle and Figures 4 and 6 from the Bender-Gestalt Test. The order of the figures as administered to the child was:

1. Triangle, plain
2. Bender Figure 4, plain
3. Bender Figure 6, plain
4. Triangle, Background (reversed)
5. Bender Figure 4, Background (reversed)
6. Bender Figure 6, Background (reversed)

The child was seated at a table upon which was clamped a screen. The child's preferred hand was extended through the curtain in such a manner that he could feel the forms behind the screen but could not see them. The examiner then said:

"I'm going to place some boards behind the curtain. Now you can't see them, but you can feel them. On the top of each board is some kind of a design or pattern. I want you to feel the board until you can draw for me what you feel, just the way it would look. When you are ready to draw, tell me. Do you understand?" The child was encouraged to feel the design for a minimum of 30 seconds and a maximum of 2 minutes. If the child asked questions as to how he should draw what he felt, he was told to "Just draw what you felt the best way you can."

Scoring consisted of categorizing each drawing into one of the five following categories:

1. correct figure
2. incorrect figure
3. correct figure with background also drawn
4. incorrect figure with background also drawn
5. background only

Cruickshank, Bice and Wallen (24) have developed a much more refined procedure for evaluating tactual motor performance, but in view of the extreme difficulty experienced by most of the children with this test, the above descriptive system seemed more appropriate. As will be seen in the discussion of results, very few of the children were able to identify correctly the figures with any accuracy.

Results

The Tactual Motor Test proved to be too difficult for the children. Only 17 out of 36 who attempted the test managed to identify correctly the triangle with plain background

(Table 24), and 2 drew pictures with a background. Not one single child could correctly identify or draw Figures 4 (Table 25) and 6 (Table 26) from the Bender-Gestalt with plain background. The confusing effect of the thumbtack background may be inferred from the smaller number of children who could identify and draw the triangle when such a distracting background was introduced. Under the conditions of a thumbtack background, only 10 of the 33 who attempted the test could correctly identify the triangle, and 7 children drew figures with a background (Table 27). Again, with thumbtack background, no child was able to identify correctly Figure 4 (Table 28) from the Bender-Gestalt, and one child was able to do so with Figure 6 (Table 29).

The drawings made by the children bore little relationship to the stimulus figures. Squares, circles, and wild scribbling were the usual productions.

Marble Board Test

The Marble Board Test was originally developed by Werner and Strauss (59). This test was devised to assess visuomotor ability. Strauss and Lehtinen (55) have emphasized the diagnostic value of this test in detecting the effects of brain injury. For a more detailed description, see Goldenberg (33), and Cruickshank, Bice, and Wallen (24).

Administration and Scoring

The experimental task is for a child to reproduce designs made of marbles on a specially constructed board. The examiner makes a design in such a way that the child cannot see

TABLE 24

TACTUAL MOTOR TEST--TRIANGLE, PLAIN

Variable	Class				Total
	C-1	C-2	E-1	E-2	
Correct figure	4	5	5	3	17
Incorrect figure	5	3	4	5	17
Correct figure with background	0	0	0	0	0
Incorrect figure with background	0	0	0	1	1
Background only	1	0	0	0	1
Total	10	8	9	9	36

TABLE 25

TACTUAL MOTOR TEST--BENDER FORM 4, PLAIN

Variable	Class				Total
	C-1	C-2	E-1	E-2	
Correct figure	0	0	0	0	0
Incorrect figure	9	7	8	9	33
Correct figure with background	0	0	0	0	0
Incorrect figure with background	0	1	0	0	1
Background only	1	0	0	0	1
Total	10	8	8	9	35

TABLE 26

TACTUAL MOTOR TEST--BENDER FORM 6, PLAIN

Variable	Class				Total
	C-1	C-2	E-1	E-2	
Correct figure	0	0	0	0	0
Incorrect figure	6	6	9	9	30
Correct figure with background	0	0	0	0	0
Incorrect figure with background	0	1	0	0	1
Background only	0	1	0	0	1
Total	6	8	9	9	32

TABLE 27

TACTUAL MOTOR TEST--TRIANGLE, BACKGROUND (REVERSED)

Variable	Class				Total
	C-1	C-2	E-1	E-2	
Correct figure	2	4	3	1	10
Incorrect figure	3	1	4	6	14
Correct figure with background	1	1	0	0	2
Incorrect figure with background	1	1	0	1	3
Background only	2	1	1	0	4
Total	9	8	8	8	33

TABLE 28

TACTUAL MOTOR TEST--BENDER FORM 4, BACKGROUND (REVERSED)

Variable	Class				Total
	C-1	C-2	E-1	E-2	
Correct figure	0	0	0	0	0
Incorrect figure	7	6	7	7	27
Correct figure with background	0	0	0	0	0
Incorrect figure with background	1	1	0	1	3
Background only	0	1	0	0	1
Total	8	8	7	8	31

TABLE 29

TACTUAL MOTOR TEST--BENDER FORM 6, BACKGROUND (REVERSED)

Variable	Class				Total
	C-1	C-2	E-1	E-2	
Correct figure	0	0	0	1	1
Incorrect figure	4	7	6	7	24
Correct figure with background	0	0	0	0	0
Incorrect figure with background	0	0	0	0	0
Background only	0	1	0	0	1
Total	4	8	6	8	26

the actual process of construction, and then, while the examiner's design is left in full sight of the child, the child attempts to reproduce the design as accurately as possible on his board. Careful note is made of how the child constructs the designs, and of any changes or shifts in the marbles. The examiner's design is then removed from sight, and the child is given an 8 1/2 by 11-inch sheet of paper and asked to draw the design. His marble board construction, of course, is left in full view while he is drawing.

Only two designs were used in this study. These were two overlapping squares, and two overlapping triangles.

The scoring scheme used is that of Goldenberg, and for complete scoring directions, this reference should be consulted. A brief description of the categories used is given here, and is by no means to be considered adequate instructions for scoring.

A. Accuracy:
   1. Perfectly accurate - score 5
   2. Generally accurate - score 3
   3. Little or no accuracy - score 1

B. Method:
   1. Continuous. This involves a consecutive placement of marbles in a single direction of movement.
   2. Segmental. For this category, there must be two or more series of consecutive placements of adjacent marbles along one or more sides of a subform.

3. Incoherent. A reproduction was scored as incoherent if it did not qualify for continuous or segmental.

C. Organization:

1. Articulate. For inclusion in this category, each subform must be completed, and overlapping subforms must overlap.
2. Global. The outline of the total configuration is followed, and other remaining parts of the pattern are fitted into this frame.
3. Aggregate. Successive closed units of the pattern are completed, but not according to the two basic subforms. Overlapping subforms must overlap.
4. Linear. Lines or portions of lines within the configuration are followed, and the production is composed of lines or closed units not corresponding to the stimulus pattern.

The drawings of the marble board designs were examined for evidences of response to the background.

Results

Tables 30 and 31 show a comparison of the two combined control groups with the two combined experimental groups on the accuracy score. As can be seen from the tables, there were no significant differences between the means of the combined groups.

Tables 32 and 33 give the method or organization for the two designs. The results are quite consistent for the two

TABLE 30

MEANS, STANDARD DEVIATIONS, AND t-TESTS OF THE SIGNIFICANCE OF DIFFERENCES BETWEEN MEANS FOR THE COMBINED CONTROL AND COMBINED EXPERIMENTAL GROUPS ON THE MARBLE BOARD NO. 1, "ACCURACY SCORE"

Class	N	$\bar{X}$	σ	*t*
C-1	9	1.89	1.37	1.51
C-2	10	2.60	1.95	
E-1	10	1.20	.60	
E-2	9	1.89	1.37	
Total	38	1.89	1.50	

TABLE 31

MEANS, STANDARD DEVIATIONS, AND t-TESTS OF THE SIGNIFICANCE OF DIFFERENCES BETWEEN MEANS FOR THE COMBINED CONTROL AND COMBINED EXPERIMENTAL GROUPS ON THE MARBLE BOARD NO. 2, "ACCURACY SCORE"

Class	N	$\bar{X}$	σ	*t*
C-1	9	2.33	1.89	.75
C-2	10	1.80	1.32	
E-1	10	1.20	.60	
E-2	8	2.25	1.71	
Total	37	1.86	1.50	

TABLE 32

METHOD OF ORGANIZATION ON THE MARBLE BOARD NO. 1

Class	N	Articulate	Global	Aggregate	Linear
C-1	9	3	1	0	5
C-2	10	2	2	1	5
E-1	10	1	1	0	8
E-2	9	2	1	1	5
Total	38	8	5	2	23

TABLE 33

METHOD OF ORGANIZATION ON THE MARBLE BOARD NO. 2

Class	N	Articulate	Global	Aggregate	Linear
C-1	9	3	1	0	5
C-2	10	2	3	1	4
E-1	10	2	1	1	6
E-2	8	2	1	0	5
Total	37	9	6	2	20

designs. The least number of reproductions are categorized as aggregate, followed by global, articulate, and linear. The small numbers, and absence of post-test information, make any sort of meaningful statistical description impractical, so the information is being included merely for comparative purposes.

Tables 34 and 35 give the method of approach on the two designs. The method of approach for the two desings is quite consistent. The order of frequency, from most to least, is incoherent, continuous, and segmental. On design 1, 22 children (57 percent) produced incoherent reproductions, and on design 2, 21 children (56 percent) produced reproductions scored as such.

When the children's drawings are examined for evidences of responses to the backgrounds rather than the figures, the classes are quite similar. For Figure 1, the background responses are as follows: C-1 had 2; C-2, 1; E-1, 0; and E-2, 3. For Figure 2, the background responses were as follows: C-1, 0; C-2, 1; E-1, 0; and E-2, 3.

Analysis of the Marble Board results yields no information that would indicate other than comparability between the experimental and control groups at the beginning of the academic year. Similar performance is observed in method of approach, method of organization, accuracy score, and background responses.

Bender-Gestalt

The Bender-Gestalt Test (14) was administered routinely to all of the children participating in the present study. Several considerations made the inclusion of this instrument

TABLE 34

METHOD OF APPROACH ON THE MARBLE BOARD NO. 1

Class	N	Continuous	Segmental	Incoherent
C-1	9	4	1	4
C-2	10	3	1	6
E-1	10	2	1	7
E-2	9	2	2	5
Total	38	11	5	22

TABLE 35

METHOD OF APPROACH ON THE MARBLE BOARD NO. 2

Class	N	Continuous	Segmental	Incoherent
C-1	9	4	1	4
C-2	10	1	3	6
E-1	10	2	2	6
E-2	8	2	1	5
Total	37	9	7	21

desirable as part of the psychological evaluation:

1. The test is easy, helps establish rapport, and all of the children, without exception enjoyed "drawing the pictures."
2. The test has been used extensively in the psychological investigation of cerebral pathology.
3. One of the most important learning problems manifested by these children is in visuo-motor activity.

Difficulty in reproducing visually perceived forms has often been considered a characteristic of brain injured children. This type of task has been included in tests of general intelligence (21, 56) as well as in various specialized tests. Bender (10, 11), Bakwin (7), and others (43 61) have emphasized the importance of such tasks in various types of organic conditions.

A number of tests have been used which involve the reproduction of visually perceived forms, including that of Benton (16), Graham and Kendall (36), Healy, Bronner _et al_. (38), and Bender (14).

The diagnostic value for discrimination of brain injured patients from normal subject populations has been mainly established on adult groups (15, 16), but recently some work has been reported on children. Baroff (8) administered the Bender-Gestalt Test to 84 twin individuals institutionalized because they were mentally defective. Seventy-six of his subjects seemed to meet the requirements for classification as endogenous. Although the number of children in his sample definitely diagnosed as brain injured (N = 8) was too small for generalization, he noted that their performance tended to be much poorer than that of children not similarly diagnosed.

Shaw and Cruickshank (51, 52) compared the Bender-Gestalt Test performance of a group of 25 institutionalized idiopathic epileptic children who were matched with a group of 25 institutionalized non-convulsive children on the basis of age, sex, and intelligence. The Pascal and Suttel scoring system was used. Comparison of the total scores for the two groups by means of the _t_-test revealed no significant difference. When comparison was made on the basis of the configuration score, however, there was a difference significant at the .02 level of confidence. In other words, the results indicate that there is a real difference between the epileptic and control subjects in the placement, size, and order of the design on the paper. The authors point out that background cannot be considered the disturbing factor in this study, because the original background is only a blank piece of paper. The authors conclude:

> From the present results, we might infer that it is not the confusing background which results in misperception, but an inability to organize thought processes in what might be considered an orderly fashion (51, p. 193).

Goldberg (32) administered the WISC and the Bender-Gestalt Test to three groups of 15 white male children who were schizophrenic, retarded and "normal," and who ranged in age from 11 to 16 years. The results showed a significant difference between the performance of the normal and both the schizophrenic and retarded groups. The difference between the schizophrenic and the retarded children approached but did not attain significance. Goldberg concluded ahat Bender-Gestalt Test score (as measured by the Pascal and Suttell scoring system) was primarily a function of intelligence in the population used, but that emotional factors also seemed to have an effect upon the score.

Aaronson (1) compared the performance of a sample of epileptic subjects with a high incidence of feeblemindedness on the Porteus Mazes and Bender-Gestalt recall. The moderate correlation of .46 between these two variables shrunk to .21 when the effect of age was held constant. Aaronson concluded that there is no practical relationship between recall of Bender figures and intelligence.

Hanvik (37) concluded that rotations usually occurred in the records of only the most disturbed children, and that very often among children producing rotations there was evidence pointing toward the probability of brain damage in the child. He is even more emphatic in saying that rotation is a more malignant sign when it occurs in children than when it occurs in adults, and that rotation is a visual-motor aberration almost pathognomic for brain damage in children.

Bice and Cruickshank (23) compared the performance of cerebral palsied children on the Bender-Gestalt. They concluded that there is a relationship between the major medical classifications in cerebral palsy and certain scoring categories devised by them. The scoring system used in the present study is the system developed by these authors.

Administration

The method of administration closely followed that described by Bender (14) and others (48). The child is seated at a table, given a pencil with an eraser, and a sheet of 8 1/2 by 11-inch paper is placed before him. On the table there is a pile of additional paper of the same dimensions. The directions are as follows: "I have some simple designs here which I want you to draw for me on this paper. Each design is on one of these cards which I will show you one at a time. You have as long as you want to draw these designs for me. Try to make your drawings look as much like the card I show you as you possibly can." This last statement, to make the drawings look as much like the cards as possible, was made quite emphatically, because the children frequently looked upon this as an opportunity to draw, and needed these instructions as a limitation. If the child asked questions, they were referred back to his own judgment. For example if the child asked "Should I count the dots?", the response was "Just try to make your drawing look as much like the card as possible."

The order of presentation was in the numerical order of the cards. An attempt was made to discourage the child from turning the paper, but if he persisted this was noted as part of the testing information.

Scoring

A number of scoring schemes have been advanced for the Bender-Gestalt (14, 23, 48). These were considered before the scoring scheme devised by Cruickshank and Bice (23) was chosen.

Even the most disorganized drawings of the children can be classified using this system. What was lost in fineness of scoring was more than made up in meaningful categorization of responses. A brief description of the categories will be given here, and the reader interested in scoring procedures and problems may consult Cruickshank and Bice (23).

Drawings were categorized according to the types of errors and distortions that were made. While many descriptive categories have been proposed by various authors, some occurred with such infrequency that they were not included in the following list. A description of the scoring categories follows:

Immature

The stanford-Binet mental age of the child was taken into consideration in scoring for this category, and Bender's (14) summary chart was used as the basis for determining the maturational level of a drawing. The child's drawing had to be at least two years maturationally below his Binet mental age for inclusion here. To avoid overlapping of categories, a drawing that was considered in this category was not included in any other. Detachment and separation, for example, may represent either immaturity or form dissociation, depending upon the mental age of the child. Similarlh, Figure 5,[1] drawn with solid lines, may represent either immaturity or incorrect elements.

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[1] All references in this section to figure numbers relate to the numbering of figures in the Bender-Gestalt Visual Motor Test.

Concrete

The only responses assigned to this category were those in which the child named the design, i.e., while drawing Figure 6, a child said: "This is a piece of string." Compulsive counting was not included here because the nature of the visual-perceptual training procedures used with these children, such as peg boards, blocks, etc., have taught many of them to count in an attempt to reproduce designs. Of course, note was routinely made of such counting and included in the qualitative evaluation of the test results. One boy, when starting to draw Figure A, lost sight of the goal set for him, and elaborated his drawing into a boy. This was scored as Concrete, even though a second request to try drawing the design again, with more firmness on the part of the examiner, resulted in a drawing that was quite acceptable. After finishing Figure A, a girl proceeded to embellish the drawing saying, "This is a kite." This was scored not only as being Concrete, but also for Form Dissociation and Distorted Angles.

Perseveration

Perseveration, as used in this category, is the continuation of an activity after it is no longer appropriate. On the Bender-Gestalt, this usually shows up on Figures 1 and 2. The stimulus for Figure 1 consists of 12 dots. If, in the child's drawing, the number of dots was more than 14, the drawing was scored for Perseveration. The stimulus for Figure 2 consists of 11 columns of circles. If the child drew more than 13, it was scored for this category. Similarly, the stimulus for

Figure 3 is made of 16 dots, so if a child drew more than this number it was scored for perseveration. Figure 3 made of loops may or may not be Perseveration, depending on the mental age of the child.

Erratic Approach

This category was used when there was no clear pattern in the drawing, and usually occurred in those figures made of dots or loops. Some children scattered dots across the page with little ability to hold to the basic pattern.

Form Dissociation

This category included detachment, displacement, and incompleteness. Detachment referred to a complete separation of the figure. A minimum of 3 millimeters was needed for inclusion here. The most frequent figure in which the elements were detached was Figure A, followed by 4 and 7. Displacement refers to a distortion of the basic configuration so that parts that should touch are actually in contact but at the wrong point. Incompleteness refers to a drawing in which an important element is missing. The stimulus for Figure 1 consists of 12 dots, so if it was drawn with less than 10 dots it was considered incomplete. The stimulus for Figure 2 consists of 11 columns, so if it was drawn with less than 9 columns, it was included here. Similarly for Figure 3, which is composed of 16 dots. If it was drawn with less than 16 dots, it was considered to be incomplete.

Closure

For inclusion of a drawing in this category, there must be an addition of parts, resulting in a closing of the pattern.

Figures 4 and 5 are the only open designs in the series. Thus, addition of a line making an enclosed rectangle of Figure 4, or addition of dots to make a circle in Figure 5, would be included in this category. Errors in this category were infrequent.

Incorrect Element

A drawing made of inappropriate parts would be included here. For example, Figure 6 drawn with loops or dots would be included here. Figure 5 made of solid lines may either represent this category, or immaturity, depending upon the mental age. Similarly, loops in Figure 3, dots in Figure 2, or lines in Figure 3 would be considered for this category.

Unrecognizable

A drawing that is so poorly executed that it must be numbered at the time it is drawn for future identification would represent this type of error. This occurred most often in designs made of dots, although the line drawings were also frequently distorted beyond recognition.

Distorted Angles

This included any marked inadequacy in the construction of angles. The most easily recognized is an inversion of the angle, so that it points toward the center of the figure, rather than pointing outward. Other angle distortions may occur by the arbitrary addition of an extra angle, abrupt changes in direction of a line resulting in a well-defined extra angle, or curves instead of angles.

Rotation

A rotation of the figure of at least 45 degrees was required for inclusion in this category. The position of the paper in relationship to the child was necessary in evaluating this error.

Compression

A marked reduction in size was the error under consideration here. Reduction of at least 50 percent in size was the criterion.

Enlargement

Enlargement of at least 50 percent was necessary for inclusion here.

Disproportion

The internal elements of a figure had to be markedly out of balance to be considered an example of Disproportion. A variation of 50 percent or more of a major element of the drawing was the criterion.

A number of the above categories contained so few responses that individual analysis was not possible. These categories included Concrete, Erratic Approach, Closure, Unrecognizable, Compression, Enlargement and Disproportion. These results are in essential agreement with Cruickshank and Bice (23). Psychologically, a number of these categories seem to "fit" together so they were added together to form combined categories. For example, Immature, Concrete, Perseveration, and Erratic Approach were summed to for Inadequate Method. Form Dissociation, Closure, Incorrect Element, Unrecognizable, Distorted Angles, and Rotation were summed to form Distortion of Configuration. Compression, Enlargement and Disproportion were combined under Size. In addition, all errors were summed to produce the Total score.

In addition to the above categories as devised and described by Cruickshank and Bice, further analysis was done on the number of rotations. This followed the scoring system devised by Pascal and Suttell (48). Further analysis was felt to be necessary in light of the importance assigned to the presence of rotations by various writers. Pascal and Suttell have devised a means of weighing various types of rotations, and their scoring approach is as follows:

Figure 1--Rotation is scored for this design if the figure is reproduced vertically rather than horizontally, or if the reproduction is rotated from the horizontal 45 degrees or more. Score 8.

Figure 2--Scored as Figure 1. Score 8.

Figure 3--When the design is rotated 45, 90, or 180 degrees. Score 8.

Figure 4--A. Curve rotation. For perfect reproduction, one line should bisect the curve and the adjacent angle of the square. The line bisecting the curve should form an angle of 135 degrees with the adjacent side of the square. When this angle is reduced to 90 degrees or less, the deviation is scored. Score 3.

B. Design rotation. This is scored when the base of the square is rotated 45 degrees or more from the horizontal, or when the curve is attached to the square more than one-third of the distance along that particular side of the square. Score 8.

Figure 5--A. Rotation of the extension. This is scored when the extension begins at or below the approximate mid-dot of the right side, or when the direction of the extension is reversed to the left rather than to the right, or when the extension begins to the left of center. Score 3.

B. Design rotation. Rotated 45 degrees or more from the horizontal. Score 8.

Figure 6--A. Scored when the vertical line is rotated to the left, more than 10 degrees from perpendicular. Score 8.

B. Scored when the horizontal line is rotated 45 degrees or more. Score 8.

Figure 7--A. Scored when the lateral hexagon is rotated so that the 30 degree angle of the stimulua design is increased to 90 degrees or decreased to 0 degrees. Score 8.

B. Scored when the entire reproduction is rotated. Score 8.

Figure 8--Scored when the base of the design is rotated 45 degrees or more from the horizontal. Score 8.

Immature

Table 36 shows the means, standard deviations, and _t_-tests of the significance of the differences between means,

TABLE 36

MEAN ERRORS, STANDARD DEVIATIONS, AND t-TEST OF THE SIGNIFICANCE OF DIFFERENCES BETWEEN MEANS FOR THE BENDER-GESTALT CATEGORY "IMMATURE"

Class	N	Pre-test		Post-test		t
		$\overline{X}$	σ	$\overline{X}$	σ	
C-1	10	1.36	1.49	.20	.60	2.18***
C-2	10	1.50	1.36	.20	.40	2.90****
E-1	10	2.90	1.92	1.20	.87	2.94****
E-2	9	2.22	1.75	1.11	1.59	2.01***
Total	39	1.97	1.76	.67	1.07	5.17*****

$^{***}p < .10$

$^{****}p < .02$

$^{*****}p < .001$

pre-test and post-test for the Bender-Gestalt category Immature. When the means of the pre-test are compared with the means of the post-test by classes, two classes, one control and one experimental, produced significantly fewer immature drawings ($p < .001$), while the other two approached significance (p .10), but did not reach the level used in this study. When the pre-test and post-test means for the total group were compared, however, the difference was highly significant ($p < .001$).

When the two combined control groups' pre-test was compared with the two combined experimental groups' pre-test, the means were significantly different at the .05 level, as can be seen from Table 37. In other words, at the beginning of the

TABLE 37

MEAN ERRORS, STANDARD DEVIATIONS, t-TESTS, AND PROBABILITIES OF CHANCE DIFFERENCES IN MEANS FOR THE CONTROL AND EXPERIMENTAL GROUPS ON THE BENDER-GESTALT CATEGORY "IMMATURE"

Group	N	$\bar{X}$	σ	t
Combined Control Groups, Pre-test	20	1.40	1.43	2.16*
Combined Experimental Groups, Pre-test	19	2.58	1.87	
Combined Control Groups, Post-test	20	.20	.51	3.05**
Combined Experimental Groups, Post-test	19	1.16	1.27	
Comparison of Control Groups, Pre-test, and Control Group, Post-test	20	1.20	1.44	3.65**
Comparison of Experimental Group, Pre-test, and Experimental Group, Post-test	19	1.42	1.66	3.62**

$^{*}p < .05$

$^{**}p < .01$

project, the experimental groups produced significantly more drawings that were at least two years maturationally below their Binet mental ages than did the control groups. This same relationship held true at the conclusion of the project, where the two combined control groups produced significantly fewer immature responses than did the two combined experimental groups. Both the experimental and control groups made significant growth ($p < .01$) over the course of the year, as may be seen in comparing pre- and post-test categories.

The above results show that at the beginning of the academic year, the combined control groups were significantly superior to the combined experimental groups in the number of Bender-Gestalt reproductions scored as Immature, and this superiority was maintained at the conclusion of the year. When comparison is made between the pre- and post-tests, however, it can be seen that both the experimental and control groups produced significantly fewer Immature responses at the end of the year.

Perseveration

Table 38 shows the means, standard deviations, and *t*-tests of the significance of differences between means for the Bender category *Perseveration*. As can be seen from the table, when considered individually by classes, or considered as a total group, there are no significant changes in the number of

TABLE 38

MEAN ERRORS, STANDARD DEVIATIONS, *t*-TESTS, AND PROBABILITIES OF CHANCE DIFFERENCES IN MEANS FOR THE BENDER-GESTALT CATEGORY "PERSEVERATION"

Class	N	Pre-test		Post-test		
		$\bar{X}$	σ	$\bar{X}$	σ	*t*
C-1	10	1.50	1.02	1.80	.87	.38
C-2	10	1.80	.98	1.30	1.10	.83
E-1	10	1.30	1.27	1.50	.81	.36
E-2	9	1.67	1.41	1.56	1.07	.23
Total	39	1.56	1.19	1.54	.98	.08

perseverative responses between the pre-test and post-test phases of the project.

Table 39 shows a comparison of the combined control and combined experimental groups. Again there are no differences, either between the total control and total experimental groups on a test, retest basis, or between the pre-test and post-test scores for the control groups or the experimental groups.

TABLE 39

MEAN ERRORS, STANDARD DEVIATIONS, t-TESTS, AND PROBABILITIES OF CHANCE DIFFERENCES IN MEANS FOR THE CONTROL AND EXPERIMENTAL GROUPS ON THE BENDER-GESTALT CATEGORY "PERSEVERATION"

Group	N	$\bar{X}$	σ	t
Combined Control Groups, Pre-test	20	1.65	1.01	.46
Combined Experimental Groups, Pre-test	19	1.47	1.35	
Combined Control Groups, Post-test	20	1.55	1.02	.06
Combined Experimental Groups, Post-test	19	1.53	.94	
Comparison of Control Group, Pre-test, and Control Group, Post-test	20	.15	1.70	.39
Comparison of Experimental Group, Pre-test, and Experimental Group, Post-test	19	.05	1.47	.02

The above results show no differences between the pre-test and post-test phases in the number of perseverations made on the Bender-Gestalt.

Form Dissociation

Table 40 shows the means, standard deviations, and *t*-tests of the significance of differences between means, pre-test and post-test, for the Bender-Gestalt category Form Dissociation.

TABLE 40

MEAN ERRORS, STANDARD DEVIATIONS, *t*-TESTS, AND PROBABILITIES OF CHANCE DIFFERENCES IN MEANS FOR THE BENDER CATEGORY "FORM DISSOCIATION"

Class	N	Pre-test		Post-test		*t*
		$\overline{X}$	σ	$\overline{X}$	σ	
C-1	10	2.90	1.81	2.20	1.54	.15
C-2	10	2.80	1.25	1.90	1.30	2.21***
E-1	10	4.50	2.29	2.50	1.50	2.34*
E-2	9	3.22	2.09	1.22	.92	2.13***
Total	39	3.36	2.02	1.97	1.42	4.34**

***$p < .10$

*$p < .05$

**$p < .01$

When examined individually by classes, only one class produced significantly fewer responses in this category in the post-testing, and this was one of the experimental classes. When the means for the total group, pre-test and post-test, are compared, however, it can be seen that significantly fewer form dissociations ($p < .01$) were produced in the post-test.

Table 41 shows a comparison of the combined control and combined experimental groups. Neither on the pre-test nor on the post-test were there significant differences between the

TABLE 41

MEAN ERRORS, STANDARD DEVIATIONS, *t*-TESTS, AND PROBABILITIES OF CHANCE DIFFERENCES IN MEANS FOR THE CONTROL AND EXPERIMENTAL GROUPS ON THE BENDER-GESTALT CATEGORY "FORM DISSOCIATION"

Group	N	$\bar{X}$	σ	*t*
Combined Control Groups, Pre-test	20	2.85	1.43	1.67
Combined Experimental Groups, Pre-test	19	3.89	2.29	
Combined Control Groups, Post-test	20	2.05	1.43	.34
Combined Experimental Groups, Post-test	19	1.89	1.41	
Comparison of Control Group, Pre-test, and Control Group, Post-test	20	.80	1.33	2.63****
Comparison of Experimental Group, Pre-test, and Experimental Group, Post-test	19	2.00	2.32	3.66**

$^{****}p < .02$

$^{**}p < .01$

two combined control group means and the two combined experimental. As can be seen from the table, however, both the combined control and combined experimental groups produced significantly fewer responses in this category in their post-test.

The above results show that all of the children produced significantly fewer errors categorized as Form Dissociation, but there were no differences between the experimental and control groups.

Incorrect Element

Table 42 shows the means, standard deviations, and *t*-tests of the significance of the differences between means for the Bender-Gestalt category *Incorrect Element*. When considered individually by classes, three of the four produced about the same number of errors or fewer in the post-testing as they did in the pre-testing. The fourth class (a control class) produced more such errors in the post-testing, but this only approached significance (p .10), not reaching the level of confidence established for this study. When considered as a total group, there was not a significant difference between the means for the pre-test and post-test scores.

TABLE 42

MEAN ERRORS, STANDARD DEVIATIONS, *t*-TESTS, AND PROBABILITIES OF CHANCE DIFFERENCES IN MEANS FOR THE BENDER CATEGORY "INCORRECT ELEMENT"

Class	N	Pre-test		Post-test		*t*
		$\bar{X}$	o	$\bar{X}$	o	
C-1	10	2.10	1.51	3.40	1.02	2.22***
C-2	10	2.20	.75	2.20	1.16	0.00
E-1	10	2.40	1.02	2.00	1.26	.69
E-2	9	1.89	1.52	1.78	1.03	.23
Total	39	2.15	1.25	2.36	1.29	.83

***p .10

Table 43 shows a comparison of the total control and total experimental groups. At the beginning of the academic

TABLE 43

MEAN ERRORS, STANDARD DEVIATIONS, *t*-TESTS, AND PROBABILITIES OF CHANCE DIFFERENCES IN MEANS FOR THE CONTROL AND EXPERIMENTAL GROUPS ON THE BENDER-GESTALT CATEGORY "INCORRECT ELEMENT"

Group	N	$\overline{X}$	σ	*t*
Combined Control Groups Pre-test	20	2.15	1.19	
Combined Experimental Groups, Pre-test	19	2.00	1.31	.36
Combined Control Groups, Post-test	20	2.80	1.25	
Combined Experimental Groups, Post-test	19	1.89	1.17	2.29*
Comparison of Control Group, Pre-test, and Control Group, Post-test	20	.65	1.37	2.06***
Comparison of Experimental Group, Pre-test, and Experimental Group, Post-test	19	.26	1.55	.72

***$p < .10$

*$p < .05$

year, the groups were quite comparable, as may be seen in the lack of significant difference in the means for the combined control and combined experimental groups in the pre-test phase. When the post-test scores are compared, however, the experimental group produced significantly fewer errors categorized as Incorrect Element than did the control group.

The above data show that the children in the experimental classes made significantly greater gains than did the children in the control classrooms, as may be seen in the fewer number of drawings in the post-test phase that were categorized as containing Incorrect Elements. The children who had the control classroom experience actually made more Bender-Gestalt reproductions containing Incorrect Elements at the end of the academic year than they did at the beginning. Thus, while the children in stimulus-free environments were improving in performance, the performance of the children in control classes were actually becoming worse.

Distorted Angles

In Table 44 are given the means, standard deviations, and *t*-tests of the significance of the differences between the means for the Bender category Distorted Angles. There are no significant differences between means either for the classes considered individually, or for the group as a whole, in the pre-test and post-test phases of this study.

TABLE 44

MEAN ERRORS, STANDARD DEVIATIONS, *t*-TESTS, AND PROBABILITIES OF CHANCE DIFFERENCES IN MEANS FOR THE BENDER CATEGORY "DISTORTED ANGLES"

Class	N	Pre-test		Post-test		
		$\overline{X}$	σ	$\overline{X}$	σ	*t*
C-1	10	2.80	.60	2.90	.70	.55
C-2	10	2.80	.40	2.50	.50	1.27
E-1	10	3.00	.52	2.90	.53	.06
E-2	9	2.67	1.05	2.78	.79	.42
Total	39	2.82	.64	2.77	.66	.05

Table 45 shows a comparison of the total control and total experimental groups. As may be seen, there are no significant differences between the control and experimental groups.

TABLE 45

MEAN ERRORS, STANDARD DEVIATIONS, t-TESTS, AND PROBABILITIES OF CHANCE DIFFERENCES IN MEANS FOR THE CONTROL AND EXPERIMENTAL GROUPS ON THE BENDER-GESTALT CATEGORY "DISTORTED ANGLES"

Group	N	$\bar{X}$	σ	t
Combined Control Groups, Pre-test	20	2.80	.51	.19
Combined Experimental Groups, Pre-test	19	2.84	.74	
Combined Control Groups, Post-test	20	2.70	.64	.65
Combined Experimental Groups, Post-test	19	2.84	.67	
Comparison of Control Group, Pre-test, and Control Group, Post-test	20	.10	.62	.70
Comparison of Experimental Group, Pre-test, and Experimental Group, Post-test	19	0.00	.65	0.00

The above data show that there were no differences between the experimental and control groups in the types of errors classified as Distorted Angles.

Rotations

Table 46 shows the means, standard deviations, and t-tests of the significance of differences between means for the

TABLE 46

MEAN ERRORS, STANDARD DEVIATIONS, *t*-TESTS, AND PROBABILITIES OF CHANCE DIFFERENCES IN MEANS FOR THE BENDER CATEGORY "ROTATIONS"

Class	N	Pre-test		Post-test		*t*
		X	σ	X	σ	
C-1	10	1.20	1.66	.70	.64	.84
C-2	10	.90	1.03	.90	.94	.67
E-1	10	1.10	1.22	1.00	1.27	.16
E-2	9	1.33	1.25	.67	.47	1.63
Total	39	1.13	1.32	.82	.90	1.17

category Rotations. As can be seen, there are no significant differences between the number of rotations produced in the pre-test and post-test phases, either considered individually by classes, or when considering the means for the total groups.

Table 47 shows a comparison of the combined experimental and combined control groups. As can be seen, there are no statistically significant differences between pre-test and post-test performance between the combined control and combined experimental groups.

The above results show no changes in the pre-test and post-test means for the category Rotations. Using the scoring criterion of 45-degree rotations may be too gross an approach to evaluating rotations.

The Pascal and Suttell scoring system takes into account partial rotations as well as rotations of the complete design.

TABLE 47

MEAN ERRORS, STANDARD DEVIATIONS, *t*-TESTS, AND PROBABILITIES OF CHANCE DIFFERENCES IN MEANS FOR THE CONTROL AND EXPERIMENTAL GROUPS ON THE BENDER-GESTALT CATEGORY "ROTATIONS"

Group	N	$\bar{X}$	σ	*t*
Combined Control Groups, Pre-test	20	1.05	1.74	.32
Combined Experimental Groups, Pre-test	19	1.21	1.24	
Combined Control Groups, Post-test	20	.80	.81	.14
Combined Experimental Groups, Post-test	19	.84	.99	
Comparison of Control Group, Pre-test, and Control Group, Post-test	20	.25	1.61	.68
Comparison of Experimental Group, Pre-test, and Experimental Group, Post-test	19	.37	1.63	.96

Their system also weights various types of rotations. An analysis of rotations using their scoring system follows.

Table 48 shows the means, standard deviations, and *t*-tests of the significance of differences between means for the number of rotations scored according to the Pascal and Suttell scoring system. As can be seen, only one class (an experimental class) approached significance ($p < .10$) when comparing the pre- and post-test rotation score. When the 39 children are considered as a total group, there is no difference between the pre- and post-testing.

TABLE 48

MEAN ERRORS, STANDARD DEVIATIONS, *t*-TESTS, AND PROBABILITIES OF CHANCE DIFFERENCES IN MEANS FOR THE NUMBER OF ROTATIONS, SCORED ACCORDING TO THE PASCAL AND SUTTELL SCORING SYSTEM

Class	N	Pre-test		Post-test		*t*
		$\overline{X}$	σ	$\overline{X}$	σ	
C-1	10	13.40	9.76	13.30	11.41	.02
C-2	10	14.70	13.40	13.60	9.55	.21
E-1	10	18.20	10.87	13.90	8.51	.94
E-2	9	15.89	13.51	7.78	7.89	2.08***
Total	39	15.54	12.09	12.26	9.78	1.36

***p .10

Table 49 shows a comparison of the combined control and combined experimental groups. At the beginning of the academic year, the mean of the combined control groups for the rotation score (14.05) was less than the mean for the combined experimental groups (17.11), but this difference was not statistically significant. At the end of the academic year, this situation had been reversed, and now the mean of the combined control groups rotation score (13.45) was slightly more than the mean of the combined experimental groups (10.52), and again this difference was not statistically significant. When the combined control groups means for the pre- and post-tests are compared, the *t*-test is .159, which is not significant. A comparison of the means of the combined experimental groups, pre- and post-test,

TABLE 49

MEAN ERRORS, STANDARD DEVIATIONS, *t*-TESTS, AND PROBABILITIES OF CHANCE DIFFERENCES IN MEANS FOR THE COMBINED CONTROL AND COMBINED EXPERIMENTAL GROUPS ON THE NUMBER ROTATIONS, SCORED ACCORDING TO THE PASCAL AND SUTTELL SCORING SYSTEM

Group	N	$\overline{X}$	σ	*t*
Combined Control Groups, Pre-test	20	14.05	11.74	.78
Combined Experimental Groups, Pre-test	19	17.11	12.25	
Combined Control Groups, Post-test	20	13.45	11.00	.77
Combined Experimental Groups, Post-test	19	10.52	8.77	
Comparison of Control Groups, Pre-test, and Control Groups, Post-test	20	.60	16.43	.16
Comparison of Experimental Groups, Pre-test, and Experimental Groups, Post-test	19	6.105	11.15	2.33*

*$p < .05$

however, results in a *t*-test of 2.33, which is significant at the .05 level of confidence.

The above results show that, when the Pascal and Suttell scoring system is used in evaluating rotations, the children in the experimental classrooms produced significantly fewer rotations at the end of the academic year than they did at the beginning. The children who experienced the control classroom during the year did not make similar progress.

Inadequate Method

Table 50 shows the means, standard deviations, and t-tests of the significance of differences between means, pre-test and post-test, for the Bender-Gestalt category, Inadequate Method. This category is a sum of our other catégories, i.e., Immature, Concrete, Perseveration, and Erratic A proach. As can be seen from Table 24, the only class that showed significantly fewer errors in this category in the post-test phase is one of the experimental classes, E-2. This difference is significant at the .02 level of confidence. When the means of all four groups are compared on a pre-test and post-test basis, the difference between means is significant at the .05 level of confidence, showing that the total group produced fewer errors categorized as Inadequate Method in the post-test phase.

TABLE 50

MEAN ERRORS, STANDARD DEVIATIONS, t-TESTS, AND PROBABILITIES OF CHANCE DIFFERENCES IN MEANS FOR THE BENDER CATEGORY "INADEQUATE METHOD"

Class	N	Pre-test		Post-test		t
		$\bar{X}$	σ	$\bar{X}$	σ	
C-1	10	2.80	1.78	2.70	2.37	.12
C-2	10	3.40	1.80	2.10	1.22	1.71
E-1	10	4.20	2.60	3.30	1.49	.90
E-2	9	4.11	2.33	3.22	2.44	3.02****
Total	39	3.62	2.20	2.82	1.99	2.66*

$^{*}p < .05$

$^{****}p < .02$

Table 51 shows a comparison of the combined control and experimental groups. The combined control groups did not make significant gains when comparing the pre-test and post-test results, but the combined experimental groups did, at the .05 level of confidence.

TABLE 51

MEAN ERRORS, STANDARD DEVIATIONS, t-TESTS, AND PROBABILITIES OF CHANCE DIFFERENCES IN MEANS FOR THE CONTROL AND EXPERIMENTAL GROUPS ON THE BENDER-GESTALT CATEGORY "INADEQUATE METHOD"

Group	N	$\overline{X}$	σ	t
Combined Control Groups, Pre-test	20	3.10	1.81	1.51
Combined Experimental Groups, Pre-test	19	4.16	2.43	
Combined Control Groups, Post-test	20	2.40	1.91	.35
Combined Experimental Groups, Post-test	19	2.42	1.57	
Comparison of Control Group, Pre-test, and Control Group, Post-test	20	.70	2.51	1.22
Comparison of Experimental Group, Pre-test, and Experimental Group, Post-test	19	1.74	2.92	2.53*

*$p < .05$

The above results show that the children, when considered as a total group, made significantly ($p < .05$) fewer drawings in the post-test phase as compared to the pre-test that could be considered under the category of Inadequate Method. The children

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in the experimental classes made fewer errors ($p < .05$) in the post-testing, but the children in the control classes did not.

Distortion of Configuration

Table 52 shows the means, standard deviations, and *t*-tests of the significance of the differences between means, pretest and post-test, for the Bender-Gestalt category Distortion of Configuration. This category is a combination of six other

TABLE 52

MEAN ERRORS, STANDARD DEVIATIONS, *t*-TESTS, AND PROBABILITIES OF CHANCE DIFFERENCES IN MEANS FOR THE BENDER CATEGORY "DISTORTION OF CONFIGURATION"

Class	N	Pre-test		Post-test		*t*
		$\bar{X}$	σ	$\bar{X}$	σ	
C-1	10	10.60	4.29	9.70	3.47	.42
C-2	10	9.90	2.74	7.70	3.23	2.13***
E-1	10	13.60	4.69	9.90	2.95	1.93***
E-2	9	10.67	5.60	7.56	2.46	1.85***
Total	39	11.21	4.65	8.74	3.25	3.42**

**$p < .01$

***$p < .10$

categories: Dissociation, Closure, Incorrect Element, Unrecognizable, Distorted Angles, and Rotation. As can be seen from the table, when the classes are considered individually, each of the four classes made fewer errors in the post-test that are classified as Distortions of the Configuration, but when the means are compared on a pre-test and post-test basis, three of the class means approached significance but did not reach the level of confidence used in this study. When all of the children are considered as a total group, however, the difference in means is significant ($p < .01$), showing that there was a decrease in the number of errors in the post-tests.

Table 53 shows a comparison of the two combined control and the two combined experimental groups. Initial comparability

TABLE 53

MEAN ERRORS, STANDARD DEVIATIONS, t-TESTS, AND PROBABILITIES OF CHANCE DIFFERENCES IN MEANS FOR THE CONTROL AND EXPERIMENTAL GROUPS ON THE BENDER-GESTALT CATEGORY "DISTORTION OF THE CONFIGURATION"

Group	N	$\bar{X}$	σ	t
Combined Control Groups, Pre-test	20	10.25	3.62	1.31
Combined Experimental Groups, Pre-test	19	12.21	5.35	
Combined Control Groups, Post-test	20	8.70	3.49	.08
Combined Experimental Groups, Post-test	19	8.79	2.96	
Comparison of Combined Control Groups, Pre-test and Control Groups, Post-test	20	1.25	2.67	2.04***
Comparison of Experimental Groups, Pre-test, and Experimental Groups, Post-test	19	3.47	5.29	2.97**

**$p < .01$

***$p < .10$

of the groups may be seen in the lack of a difference between the control and experimental classes in the pre-test phase of the project. As can be seen from the table, a comparison of the pre-test and post-test scores for the combined experimental groups shows a significant decrease ($p < .01$) in the number of errors for this group. A similar comparison for the combined control groups approaches significance (.10) but does not reach the level of confidence used in this study.

The above data show that the children in the experimental classes made significantly fewer errors that are classified as distortions of the basic configuration, and although the children in the control classes made fewer numbers of such errors in the post-test phase, this did not reach the level of confidence set for this study.

Size

Table 54 shows the means, standard deviations, and *t*-tests of the significance of differences between means, pre-test

TABLE 54

MEAN ERRORS, STANDARD DEVIATIONS, *t*-TESTS, AND PROBABILITIES OF CHANCE DIFFERENCES IN MEANS FOR THE BENDER CATEGORY "SIZE"

Class	N	Pre-test		Post-test		*t*
		X	σ	X	σ	
C-1	10	2.70	1.27	3.50	2.58	1.18
C-2	10	2.90	1.92	2.70	2.45	.18
E-1	10	3.10	1.87	2.20	1.08	1.22
E-2	9	2.67	1.56	1.44	.96	1.91
Total	39	2.85	1.69	2.49	2.07	.86

and post-test, for the Bender-Gestalt category, Size. Three other categories were summed to make this category: Compression, Enlargement, and Disproportion. As can be seen from the table, no class made significantly fewer errors when comparing the pre-test and post-test.

Table 55 shows a comparison of the combined control and combined experimental groups. There was not a significant gain in the reduction of errors of size for the combined control

TABLE 55

MEAN ERRORS, STANDARD DEVIATIONS, *t*-TESTS, AND PROBABILITIES OF CHANCE DIFFERENCES IN MEANS FOR THE CONTROL AND EXPERIMENTAL GROUPS ON THE BENDER-GESTALT CATEGORY "SIZE"

Group	N	$\overline{X}$	σ	*t*
Combined Control Groups, Pre-test	20	2.80	1.63	.16
Combined Experimental Groups, Pre-test	19	2.89	1.74	
Combined Control Groups, Post-test	20	3.10	2.55	1.94
Combined Experimental Groups, Post-test	19	1.84	1.09	
Comparison of Control Group, Pre-test, and Control Group, Post-test	20	.30	2.85	.46
Comparison of Experimental Group, Pre-test, and Experimental Group, Post-test	19	1.05	2.04	2.19*

*$p < .05$

groups when comparing the pre-test and post-test results. A similar comparison for the two combined experimental groups, however, resulted in a statistically significant differenct ($p < .05$).

The above results show that, either considered individually by classes or considered as a total group, there was not a significant reduction in errors of size between the pre-test and post-test period. When the analysis was made in terms of combining the two control classes and comparing them on a pre-test and post-test basis, no difference was observed. Comparison of the two combined experimental classes on a pre-test and post-test basis, however, showed a difference that was significant at the .05 level of confidence. In other words, the children in the experimental classes made significantly fewer errors of size (compression, enlargement, disproportion) at the end of the academic year, but the control groups did not show a similar gain.

Total

Table 56 shows the means, standard deviations, and t-tests of the significance of differences between means, pre-test

TABLE 56

MEAN ERRORS, STANDARD DEVIATIONS, t-TESTS, AND PROBABILITIES OF CHANCE DIFFERENCES IN MEANS FOR THE BENDER CATEGORY "TOTAL"

Class	N	Pre-test		Post-test		t
		$\overline{X}$	σ	$\overline{X}$	σ	
C-1	10	15.50	4.59	15.90	6.89	.22
C-2	10	16.20	4.31	12.50	5.20	2.29*
E-1	10	20.90	7.98	15.40	4.80	1.97
E-2	9	17.44	7.99	12.22	4.18	2.91****
Total	39	17.51	6.76	14.05	5.64	3.23**

**$p < .01$
****$p < .02$
*$p < .05$

and post-test, for the Bender-Gestalt category, Total. When considered individually by classes, only two classes showed significantly fewer errors between the pre-test and post-test. Of these two classes, one was a control group and the other an experimental group. When all four classes were combined, however, the total group made statistically significantly fewer errors ($p < .01$) in the post-test period.

Table 57 shows a comparison of the two combined control and two combined experimental classes. There were no significant differences between the means of the combined control and

TABLE 57

MEAN ERRORS, STANDARD DEVIATIONS, *t*-TESTS, AND PROBABILITIES OF CHANCE DIFFERENCES IN MEANS FOR THE CONTROL AND EXPERIMENTAL GROUPS ON THE BENDER-GESTALT CATEGORY "TOTAL"

Group	N	$\bar{X}$	σ	*t*
Combined Control Groups, Pre-test	20	15.85	4.46	1.60
Combined Experimental Groups, Pre-test	19	19.26	8.17	
Combined Control Groups, Post-test	20	14.20	6.34	.11
Combined Experimental Groups, Post-test	19	13.89	4.79	
Comparison of Control Group, Pre-test, and Control Group, Post-test	20	1.65	5.61	1.28
Comparison of Experimental Group, Pre-test, and Experimental Group, Post-test	19	5.37	7.02	3.24**

**$p < .01$

combined experimental groups, either pre-test or post-test. There was not a significant difference between the combined control groups, pre-test and post-test, but there was a difference ($p < .01$) between the means of the combined experimental groups, pre-test and post-test. In other words, the experimental groups showed greater improvement over the course of the year, as may be seen in the significantly fewer total number of errors made in the post-test phase, as compared with the pre-test results.

The above data show that the total group improved markedly in their ability to reproduce the Bender-Gestalt figures, but that the children in the experimental classes showed significantly greater improvement in this ability than did the children in the control classes.

Summary

A number of categories (Concrete, Erratic Approach, Closure, and Unrecognizable) contained so few errors that statistical analyses were not possible. An analysis of the categories that were amenable to statistical analyses, however, showed a number of categories (6 out of 10) in which the children who were in stimulus-free rooms made significant progress over the course of the year, while the children placed in control classrooms did not make such progress. As the children had been carefully matched for chronological age, mental age, and intelligence quotient, differences between the groups may be assumed to be reflections of the environment differences and specialized teaching methods.

The types of errors in which the children in the non-stimulating rooms showed significant improvement were in Incorrect Elements (lines for dots, dots for loops, etc.), Rotations, Distortion of the Configuration, errors of Size (enlargement, compression, disproportion), Inadequate Method (a combination of Immature, Concrete, Perseveration, and Erratic Approach), and the Total number of errors.

No differences between the experimental and control groups were found for the categories Immature, Concrete, Perseveration, and Erratic Approach. The number of errors classified as Concrete and Erratic Approach was so small that individual analyses were not undertaken. These four categories were summed to produce the combined category Inadequate Method, however, and when this category is considered, the children in the stimulus-free rooms were seen to make significant progress over the course of the year, while the children in the contol classes did not. Similarly, there were too few errors classified as Closure and Unrecognizable for individual analysis. For Form Dissociation and Distorted Angles, there were no differences between the experimental and control groups. When Form Dissociation, Closure, Incorrect Element, Unrecognizable, Distorted Angles, and Rotations were summed to form the combined category Distortion of the Configuration, however, the children in the experimental classes were seen to make significantly fewer errors at the end of the year, while the children in control classes did not do so.

These results show the ameliorative effect of a non-stimulating environment and specialized teaching methodology on the visuo-motor performance of children having specific learning disabilities.

Syracuse Visual Figure Background Test

The Syracuse Visual Figure Background Test[1] is a variation of a tachistoscopic test used originally by Strauss and Werner (58), Dolphin (28), and Myklebust (46). For a more detailed description of its administration, construction, scoring, and theoretical considerations in its use, see Cruickshank, Bice and Wallen (24).

The SVFB consists of 16 pictures arranged in four series which are flashed on a screen by means of a projector for exposure times varying from .50 to .04 second. The pictures are of common objects, embedded in a structured background. In addition, the first picture in each series is presented without the distracting influence of background.

Various writers have emphasized the impairment of the figure-background relationship in brain injury. The rationale for the SVFB is based on the Gestalt conceptions developed by Vernon (56, 57), Goldstein (34), and others.

Procedure

The screen was placed at a distance of 82 inches from the projector, and the child was seated so that his head was about a foot in front of the projector. The room was darkened as much as possible. When ready, the child was given the following instructions: "Watch the screen. I'm going to show you some pictures for just a short time and then ask you to tell me what you saw. Watch very carefully." Then the demonstration slides were shown, the first two for indefinite exposures greater than .5 second, and the third at .05 second. When each slide was shown, every attempt was made to insure the attention of the child being directed toward the stimulus materials. After each picture was flashed on the screen, the examiner said only: "Tell me what you saw." The child's responses were taken down verbatim on the record sheet. This same procedure was followed for series B at .2 second, series C at .1 second, and series D at .04 second. If the child responded with "don't know," it was permissible to say. "What do you think it was?"

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[1] Referred to hereinafter as the SVFB Test.

Scoring

The scoring procedure followed is the same as that used by Cruickshank, Bice and Wallen (24). Each response was categorized into one of eight categories. The categories are as follows:

1. Correct Figure--Either the figure originally intended or a figure which in the judgment of the examiner is equally well represented by the slide. The correct figure in the plural is not included in this category.
2. Slightly Incorrect Figure--Any figure which, in the judgment of the examiner, closely approximates the intended figure but not closely enough to be "1."

This category includes plurals of correct figures where the plurality in the judgment of the examiner is not due to the background.

3. Correct Figure with Background--Figure as defined in 1, plus any general reference to background such as lines, circles, design, pattern, etc., also any interpretation of background such as eggs, pillows, lips, screen, rug, tablecloth, wallpaper, etc.
4. Same as "4" but with figure as defined in "2," i.e., slightly incorrect figure with background.
5. Incorrect Figure--Any response which, in the judgment of the examiner, is to the figure but which is so poorly represented by the actual figure to prohibit classification under "2."
6. Incorrect Figure with Background--Same as "3" but with figure defined as in "5."
7. "Don't know"--All "don't knows," plus any other comment which does not commit the subject to responses.
8. Background Only--Any response which, in the judgment of the examiner, relates to the background exclusively.

Reliability data for the above categories have been reported elsewhere (24). The split-half reliability for "number correct" was .89, and for "number background" was .92.

In addition to the above categories, the performance of the children was examined for evidences of perseveration. It was noticed that many children gave the same response to several of the tachistoscopic presentations, or would repeat responses which were correct at slower speeds when the pictures were projected at a faster speed. The number of repetitions was summed and considered as evidences of perseveration.

Results

Number Correct

Table 58 shows the means, standard deviations, and *t*-tests of the significance of the differences between means for

TABLE 58

MEANS, STANDARD DEVIATIONS, *t*-TESTS, AND PROBABILITIES OF CHANCE DIFFERENCES IN MEANS FOR THE SYRACUSE VISUAL FIGURE BACKGROUND TEST, "NUMBER CORRECT" SCORE

Class	N	Pre-test		Post-test		*t*
		$\bar{X}$	σ	$\bar{X}$	σ	
C-1	10	5.70	3.10	7.40	3.32	2.83****
C-2	10	5.10	2.17	7.60	2.29	8.59*****
E-1	10	2.20	1.66	5.00	3.07	3.75**
E-2	9	3.78	3.52	7.22	2.62	5.65**
Total	39	4.21	3.01	6.79	3.05	8.35*****

*****p < .001
**p < .01
****p < .02

the Number Correct score on the SVFB. When considered by classes, as can be seen from the table, each class saw significantly more correct slides on the post-test than they did on the pre-test. The group considered as a whole also made significant gains (p < .001) in this report.

Table 59 shows a comparison of the total control and total experimental groups. The control groups saw significantly more correct responses at the beginning of the project than did the experimental groups ($p < .05$). At the end of the academic year, however, this difference had decreased to the point where it was no longer of significance, showing that the experimental groups had overcome their initial relative inadequacy.

TABLE 59

MEANS, STANDARD DEVIATIONS, *t*-TESTS, AND PROBABILITIES OF CHANCE DIFFERENCES IN MEANS FOR THE CONTROL AND EXPERIMENTAL GROUPS ON THE SYRACUSE VISUAL FIGURE BACKGROUND TEST, "NUMBER CORRECT"

Group	N	$\bar{X}$	σ	*t*
Combined Control Groups, Pre-test	20	5.40	2.69	2.71*
Combined Experimental Groups, Pre-test	19	2.95	2.82	
Combined Control Groups, Post-test	20	7.50	2.85	1.49
Combined Experimental Groups, Post-test	19	6.05	3.07	
Comparison of Control Group, Pre-test, and Control Group, Post-test	20	2.10	1.54	5.92*****
Comparison of Experimental Group, Pre-test, and Experimental Group, Post-test	19	3.1	2.15	6.13*****

*****$p < .001$

*$p < .01$

When the performance of the control groups is compared on a test-retest basis, the difference is very significant ($p < .001$). The same comparison for the experimental groups results in the same significant difference. In other words, both the combined experimental and combined control groups saw significantly more correct slides in the post-test period.

The above results show that both the control and experimental groups increased in ability to see pictures flashed on a screen for varying speeds of time. The children in the control classes were able to do this much better than the children in the experimental classes at the beginning of the academic year, but by the end of the year this difference had disappeared, i.e., there was no longer a significant difference between them.

Number Background

Table 60 shows the means, standard deviations, and *t*-tests of the significance of differences between means for the

TABLE 60

MEANS, STANDARD DEVIATIONS, *t*-TESTS, AND PROBABILITIES OF CHANCE DIFFERENCES IN MEANS FOR THE SYRACUSE VISUAL FIGURE BACKGROUND TEST, "NUMBER BACKGROUND" SCORE

Class	N	Pre-test		Post-test		*t*
		$\overline{X}$	σ	$\overline{X}$	σ	
C-1	10	3.10	2.47	2.00	1.55	1.48
C-2	10	2.20	1.99	2.10	1.58	.19
E-1	10	3.10	2.47	1.60	1.56	2.36*
E-2	9	2.67	2.71	1.11	1.29	2.22***
Total	39	2.77	2.44	1.72	1.55	2.60****

****$p < .02$

*$p < .05$

***$p < .10$

SVFB Test, Number Background. As can be seen, neither of the control groups showed significant improvement between the pre-test and post-test phases. On the other hand, one of the experimental groups made significantly fewer background responses in the post-test ($p < .05$), and the other experimental class approached significance ($p < .10$). The total group of 39 children made significantly fewer ($p < .02$) background responses at the end of the academic year.

Table 61 shows a comparison of the combined control and combined experimental groups. At the beginning of the school

TABLE 61

MEANS, STANDARD DEVIATIONS, t-TESTS, AND PROBABILITIES OF CHANCE DIFFERENCES IN MEANS FOR THE CONTROL AND EXPERIMENTAL GROUPS ON THE SYRACUSE VISUAL FIGURE BACKGROUND TEST, "NUMBER BACKGROUND RESPONSES"

Group	N	$\bar{X}$	σ	t
Combined Control Groups, Pre-test	20	2.65	2.29	.30
Combined Experimental Groups, Pre-test	19	2.89	2.59	
Combined Control Groups, Post-test	20	2.05	1.56	1.37
Combined Experimental Groups, Post-test	19	1.37	1.46	
Comparison of Control Group, Pre-test, and Control Group, Post-test	20	.65	2.10	1.35
Comparison of Experimental Group, Pre-test, and Experimental Group, Post-test	19	1.53	2.14	3.14^{**}

$^{**}p < .01$

year, the mean of the combined control groups (2.65) was slightly less than the mean of the combined experimental groups (2.89), but this difference was not statistically significant. By the end of the academic year, however, this situation was reversed, and the mean of the combined control groups (2.05) was slightly more than the mean of the combined experimental groups (1.37), but, again, this difference was not statistically significant. When the combined control groups are compared on a pre-test and post-test basis, no significant improvement is noted. The experimental groups, on the other hand, show a significant improvement ($p < .01$) in the pre-test,post-test comparison.

The above data show that the children in the experimental classes produced significantly fewer background responses when comparing pre-test and post-test performance than did the children in the control classes. These data suggest that there may have been a partial ameliorative effect of the more non-stimulating experimental classroom environments and the specialized teaching methodology on the ability of the experimental subjects in the discrimination of the figure-background relationship and in the ability of these same subjects to withstand the impact of extraneous stimuli in the background.

Perseveration

Table 62 shows the means, standard deviations, and *t*-tests of the significance of differences between means for the SVFB Test, Perseveration. As can be seen, one of the control classes produced significantly fewer perseverations in the post-test period ($p < .05$), and one of the experimental classes approached significance ($p < .10$).

TABLE 62

MEANS, STANDARD DEVIATIONS, t-TESTS, AND PROBABILITIES OF CHANCE DIFFERENCES IN MEANS FOR THE SYRACUSE VISUAL FIGURE BACKGROUND TEST, "NUMBER OF PERSEVERATIONS" SCORE

Class	N	Pre-test		Post-test		t
		$\bar{X}$	σ	$\bar{X}$	σ	
C-1	10	3.20	2.82	1.10	1.45	2.40*
C-2	10	1.90	2.66	1.50	2.80	.59
E-1	10	4.90	3.75	2.90	1.92	2.23***
E-2	9	2.40	2.79	1.30	1.25	1.31
Total	39	3.13	3.25	1.72	1.78	3.36**

**p < .01
*p < .05
***p < .10

Table 63 shows a comparison of the total control group and the total experimental group. As can be seen, comparison of the pre-test and post-test scores shows that both groups made significant gains over the course of the year, as may be inferred from the fewer number of perseverative responses made in the post-test situation.

The above data show that there was no difference between the children in the stimulus-free classrooms, and those in the control classrooms, when considering the number of perseverative responses on the SVFB. When all of the project children are considered as a group, however, the difference between the pre-test and post-test means was significantly different (p < .01), showing that all of the children were less perseverative at the end of the academic year.

TABLE 63

MEANS, STANDARD DEVIATIONS, *t*-TESTS, AND PROBABILITIES OF CHANCE DIFFERENCES IN MEANS FOR THE CONTROL AND EXPERIMENTAL GROUPS ON THE SYRACUSE VISUAL FIGURE BACKGROUND TEST, "NUMBER OF PERSEVERATIONS"

Group	N	$\bar{X}$	σ	*t*
Combined Control Groups, Pre-test	20	2.35	2.82	1.13
Combined Experimental Groups, Pre-test	19	3.74	3.55	
Combined Control Groups, Post-test	20	1.30	1.65	1.23
Combined Experimental Groups, Post-test	19	2.00	1.81	
Comparison of Control Group, Pre-test, and Control Group, Post-test	20	1.25	2.53	2.16*
Comparison of Experimental Group, Pre-test, and Experimental Group, Post-test	19	1.58	2.72	2.46*

$^*p < .05$

Summary

When the means between the pre-test and post-test are compared, the children as a total group showed significantly increased ability to see correct figures when slides were flashed tachistoscopically on a screen. Although the children in the control classes saw significantly more correct slides at the beginning of the school year, the children in the experimental classes had caught up with them by the end of the academic year.

As a total group, the children were also much less perseverative at the end of the year on the SVFB Test. The children in the experimental classes showed much less distraction by the background at the end of the year. In contrast, the children in the control classes were still almost as distracted and confused by the background at the conclusion of the academic year as they were at the beginning.

The SVFB Test results are especially significant when considered in light of the views of Strauss, Werner and their associates (55, 59, 60). These results show the ameliorative effects of a stimulus-free environment and specialized teaching methods on visual-perceptual performance, especially on figure-background distractions.

Vineland Scale of Social Maturity

Background

The Vineland Scale of Social Maturity has been widely used to evaluate the social competence of children. The scale is made up of items of increasing average difficulty, and includes areas of maturation in social independence, such as self-help, self-direction, locomotion, occupation, communication, and social relations. The interested reader is referred to review sources by Doll (25, 26, 27), which cover the existing research concerned with this instrument.

Results

A summary of the Vineland Scale of Social Maturity social quotients is shown in Table 64. Three classes made a significant gain in the rate of social development over the course of the year, as may be seen in the statistically significant t-tests of the differences between pre-test and post-test means. A further comparison of the combined control groups and combined experimental groups is shown in Table 65. A comparison of the combined control groups, pre-test, and combined control groups, post-test, shows a significant increase in social quotients, and so does the same comparison made with the combined experimental groups.

TABLE 64

MEAN SOCIAL QUOTIENTS, STANDARD DEVIATIONS, t-TESTS, AND PROBABILITIES OF CHANCE DIFFERENCES IN MEANS FOR THE VINELAND SCALE OF SOCIAL MATURITY: SOCIAL QUOTIENTS

Class	N	Pre-test		Post-test		t
		$\bar{X}$	σ	$\bar{X}$	σ	
C-1	10	89.20	11.80	97.40	14.11	2.16
C-2	10	81.50	16.54	96.50	10.49	2.62^{*}
E-1	10	85.60	11.83	99.00	8.79	4.87^{**}
E-2	9	89.67	10.54	98.22	10.87	3.02^{****}
Total	39	86.41	13.35	97.77	11.28	5.72^{**}

$^{**}p < .01$

$^{****}p < .02$

$^{**}p < .05$

TABLE 65

MEAN SOCIAL QUOTIENTS, STANDARD DEVIATIONS, *t*-TESTS, AND PROBABILITIES OF CHANCE DIFFERENCES IN MEANS FOR THE COMBINED CONTROL AND EXPERIMENTAL GROUPS ON THE VINELAND SCALE OF SOCIAL MATURITY: SOCIAL QUOTIENTS

Group	N	$\bar{X}$	σ	*t*
Combined Control Groups, Pre-test	20	85.35	14.85	.48
Combined Experimental Groups, Pre-test	19	87.53	11.42	
Combined Control Groups, Post-test	20	96.95	12.44	.44
Combined Experimental Groups, Post-test	19	98.63	9.83	
Comparison of Control Group, Pre-test, and Control Group, Post-test	20	11.50	14.97	3.38^{**}
Comparison of Experimental Group, Pre-test, and Experimental Group, Post-test	19	11.11	8.48	5.55^{**}

$^{**}p < .01$

The above results show that the children as a total group made significant gains in the rate of development of social competence. The improvement of the children was independent of their placement in a control or experimental class.

Stanford Achievement Test

Background

At the beginning of the academic period, an attempt was made to administer the Stanford Achievement Test, Form J, to all of the project children. At that time, only 12 children were able to complete all or part of this test. Failure was caused in part by inability to follow directions, distractibility, or inability to read. The pre-tests were administered individually to each child by the staff psychologist. An attempt was made to obtain as good an estimate of academic achievement as possible, free of the distracting elements of the average classroom. Therefore, rooms as free of distracting stimuli as ppssible for the school to provide were used for testing. The directions for administering these tests were carefully followed. In no instance was help given to the child other than that specifically allowed in the directions, and careful note was made of the time.

The Primary Battery, Form J, is for use at the end of Grade 1, in Grade 2, and in the first half of Grade 3. The Primary Battery consists of five tests: paragraph meaning, word meaning, spelling, arithmetic reasoning, and arithmetic computation. A brief description of each of the subtests follows:

1. Paragraph Meaning

This subtest consists of a series of paragraphs, graduated in difficulty, from each of which a word is missing.

The task of the child is to demonstrate his understanding of the paragraph by choosing the correct word from a list of four possible choices.

2. Word Meaning

This subtest uses a multiple-choice type of item, in which the child is required to select the proper answer for a given stimulus word from a series of four alternatives. The central importance of word knowledge in the acquisition of reading skills and almost all kinds of information needs no elaboration.

3. Spelling

This subtest is made up of a 30-item dictation-type spelling test. The examiner reads a word, then uses the word in an illustrative sentence, and then repeats the word again. The list of words is carefully chosen for level of difficulty.

4. Arithmetic Reasoning

Increasing attention is being paid to the desirability of laying a good, solid foundation of meanings and understandings prior to the teaching of formal computational skills, and this subtest attempts to assess this type of understanding. The first half of the subtest consists of picturial items designed to measure understanding of basic quantitative and numerical concepts. The last half attempts to measure problem-solving ability.

5. Arithmetic Computation

This subtest consists of 46 computational exercises which primarily involve the skills of addition and subtraction of whole numbers, but also has examples of multiplication and division.

At the conclusion of the academic year, each teacher assumed the responsibility for administering the Stanford Achievement Test, Form J, to all the children in her class. The post-test was administered individually, and the teacher first became familiar with the directions. Careful note of time was kept, and the directions were followed to the letter. The decision was made to have the teachers, rather than the staff psychologist, administer the post-tests because of the short period of time available for testing.

Results

At the beginning of the academic year, only 12 children were able to finish all or part of the Stanford Achievement Test. The children were either unable to read, or else were so distractible that they could not follow directions. Table 66 gives the grade level means and standard deviations for the subtests that all 12 children were able to complete: Paragraph Meaning, Average Reading, Spelling, and Arithmetic Computation. The post-test means for these same 12 children are also given in the table for comparative purposes, and *t*-tests of the significance of differences between pre- and post-test means were computed. As can be seen, the differences are significant for three of the four subtests: Paragraph Meaning, Average Reading, and Spelling. Although the post-test grade level mean for the Arithmetic Computation subtest is larger than the pre-test mean,

TABLE 66

MEAN GRADE LEVELS, STANDARD DEVIATIONS, t-TESTS, AND PROBABILITIES OF CHANCE DIFFERENCES IN MEANS FOR THE PRE- AND POST-TEST ACHIEVEMENT SUBTESTS ON WHICH 10 OR MORE CHILDREN WERE ABLE TO PERFORM

Subtest	N	Pre-test		Post-test		t
		$\bar{X}$	σ	$\bar{X}$	σ	
Paragraph Meaning	12	1.73	.52	2.54	.92	2.55****
Average Reading	12	1.49	.94	2.64	.96	2.84**
Spelling	11	2.11	.76	2.95	.59	2.74****
Arithmetic Computation	10	2.20	.49	2.78	.49	.79

**$p < .01$

****$p < .02$

showing that progress had occurred, this difference was not statistically significant.

Table 67 shows the grade level means and standard deviations for the other subtests, as well as the number of children completing each subtest. Although the very small number of children completing each subtest is too small for meaningful

TABLE 67

MEAN GRADE LEVELS AND STANDARD DEVIATIONS FOR REMAINDER OF SUBTESTS

Subtest	N	Pre-test		Post-test	
		$\bar{X}$	σ	$\bar{X}$	σ
Word Meaning	6	2.50	.98	3.35	1.14
Arithmetic Reasoning	3	2.73	.66	3.37	.37
Average Arithmetic	3	2.73	.39	3.33	.21
Battery Median	3	2.63	.48	3.17	.60

statistical comparison, it should be noted that the post-test mean for each subtest is larger than the pre-test mean, indicating substantial growth over the course of the academic year.

Table 68 gives a comparison of the number of control and experimental children who were able to do all or part of the achievement test at the beginning of the school year. The post-test grade levels are also given although, again, the number of

TABLE 68

COMPARISON OF PRE-TEST AND POST-TEST ACHIEVEMENT TEST GRADE LEVELS FOR THE TWO COMBINED EXPERIMENTAL AND TWO COMBINED CONTROL GROUPS[a]

Subtest	Pre-test				Post-test			
	Control		Experimental		Control		Experimental	
	N	$\overline{X}$	N	$\overline{X}$	N	$\overline{X}$	N	$\overline{X}$
Paragraph Meaning	7	1.71	5	1.76	7	1.76	5	2.02
Word Meaning	3	3.13	3	1.87	3	4.2	3	2.50
Average Reading	7	1.56	5	1.40	7	2.97	5	2.18
Spelling	6	2.50	5	1.64	6	3.13	5	2.72
Arithmetic Reasoning	1	3.20	2	2.25	1	3.80	2	3.15
Arithmetic Computation	6	2.25	4	2.13	6	2.33	4	2.88
Average Arithmetic	1	3.10	2	2.55	1	3.6	2	3.20
Battery Median	1	3.30	2	2.30	1	4.0	2	2.75

[a] Only 12 children were able to finish all or part of the achievement test at the beginning of the academic year. The post-test scores for these same children are given above for comparative purposes.

children is so small that meaningful comparison cannot be made (N's vary from 7 to 1). It should be noted, however, that in every instance the post-test mean is larger than the pre-test mean, showing improvement for each subtest.

Table 69 gives a comparison of the combined control and combined experimental groups for the post-test Stanford Achievement Test. As can be seen, there are no statistically significant differences between the control and experimental groups on the post-test grade scores. Tables 70 through 77 give the grade level and means and standard deviations by class for each of the subtests.

TABLE 69

GRADE LEVEL MEANS, STANDARD DEVIATIONS, t-TESTS, AND PROBABILITIES OF CHANCE DIFFERENCES IN MEANS FOR THE CONTROL AND EXPERIMENTAL GROUPS ON THE STANFORD ACHIEVEMENT TEST, PRIMARY BATTERY, FORM J

Subtest	Combined Groups				t
	Control		Experimental		
	$\bar{X}$	σ	$\bar{X}$	σ	
Paragraph Meaning	2.29	3.07	2.07	.41	.69
Word Meaning	2.51	1.07	2.41	.50	.28
Average Reading	2.35	1.01	2.25	.45	.33
Spelling	2.21	.87	2.41	.68	.68
Arithmetic Reasoning	1.52	1.61	2.06	.85	1.26
Arithmetic Computation	2.21	.77	2.27	.68	.02
Average Arithmetic	2.02	.85	2.21	.71	.72
Battery Median	2.04	1.04	2.55	.36	1.53

Because of the very small number of students who were able to complete all or part of the Stanford Achievement Test at the beginning of the year, a statistically meaningful comparison

TABLE 70

GRADE LEVEL MEANS AND STANDARD DEVIATIONS FOR THE POST-TEST ACHIEVEMENT SCORES, PARAGRAPH MEANING

Class	N	$\bar{X}$	σ
C-1	7	2.23	.71
C-2	7	2.36	1.18
E-1	8	2.15	.38
E-2	4	1.93	.43
Total	26	2.19	.77

TABLE 71

GRADE LEVEL MEANS AND STANDARD DEVIATIONS FOR THE POST-TEST ACHIEVEMENT SCORES, WORD MEANING

Class	N	$\bar{X}$	σ
C-1	7	2.51	1.16
C-2	6	2.50	.96
E-1	8	2.49	.51
E-2	4	2.25	.45
Total	25	2.46	.85

between the combined experimental and control groups was not possible. At the end of the year, however, enough children were able to perform on the test so that such a comparison could be made. Such a comparison showed that there was not a statistically significant difference between the groups on their post-test

TABLE 72

GRADE LEVEL MEANS AND STANDARD DEVIATIONS FOR THE POST-TEST ACHIEVEMENT SCORES, AVERAGE READING

Class	N	$\bar{X}$	σ
C-1	7	2.36	.92
C-2	7	2.36	1.10
E-1	8	2.31	.45
E-2	4	2.13	.43
Total	26	2.31	.81

TABLE 73

GRADE LEVEL MEANS AND STANDARD DEVIATIONS FOR THE POST-TEST ACHIEVEMENT SCORES, SPELLING

Class	N	$\bar{X}$	σ
C-1	9	2.30	.82
C-2	8	2.11	.92
E-1	8	2.85	.37
E-2	7	1.90	.61
Total	32	2.30	.80

performance. The post-test means were, in all cases, greater than the pre-test means for all the children, showing that definite progress in all classes had occurred.

TABLE 74

GRADE LEVEL MEANS AND STANDARD DEVIATIONS FOR POST-TEST ACHIEVEMENT SCORES, ARITHMETIC REASONING

Class	N	$\bar{X}$	σ
C-1	10	2.05	.97
C-2	10	1.99	.84
E-1	10	2.18	.86
E-2	9	1.92	.83
Total	39	2.04	.88

TABLE 75

GRADE LEVEL MEANS AND STANDARD DEVIATIONS FOR POST-TEST ACHIEVEMENT SCORES, ARITHMETIC COMPUTATION

Class	N	$\bar{X}$	σ
C-1	9	2.27	.91
C-2	10	2.15	.61
E-1	10	2.23	.61
E-2	8	2.33	.76
Total	37	2.24	.73

TABLE 76

GRADE LEVEL MEANS AND STANDARD DEVIATIONS FOR POST-TEST ACHIEVEMENT SCORES, AVERAGE ARITHMETIC

Class	N	$\bar{X}$	σ
C-1	10	2.03	1.02
C-2	10	2.01	.64
E-1	10	2.18	.71
E-2	8	2.24	.72
Total	38	2.11	.79

TABLE 77

GRADE LEVEL MEANS AND STANDARD DEVIATIONS FOR POST-TEST ACHIEVEMENT SCORES, BATTERY MEDIAN

Class	N	$\bar{X}$	σ
C-1	10	1.89	1.07
C-2	6	2.28	.93
E-1	7	2.60	.34
E-2	4	2.48	.36
Total	27	2.25	.87

Summary of Psychological Data

On the four tests of intelligence given at the beginning of the project (Stanford-Binet, Goodenough Intelligence Test, Ammons Full Range Picture Vocabulary, and Coding and Block Design from the WISC), no differences between classes, or between the combined control and combined experimental groups, were observed. Only two of the intelligence tests were administered on a pre-test and post-test basis (Stanford-Binet and Goodenough Intelligence Test), and no statistically significant differences were found between scores made at the beginning of the year and scores made at the end.

Careful matching of the groups was also reflected in the similar scores of the four groups on the perceptual tests (Bender-Gestalt, SVFB, Tactual Motor Test, and Marble Board Test) at the beginning of the school year. Only two of these tests were administered on a pre-test and post-test basis (Bender-Gestalt and SVFB). On the Bender-Gestalt Test, the experimental group made significant improvement on six of the ten scoring categories (Incorrect Elements, Rotations, Distortion of the Configuration, Size, Inadequate Method, and Total Number of Errors).

At the beginning of the academic year, the combined control groups saw significantly more correct figures on the SVFB than did the experimental groups. By the end of the year, however, the experimental groups had caught up with the control groups. What is of even more importance from a theoretical point of view is that the children in the experimental groups had improved significantly in their ability to withstand distractibility by background stimuli, as may be seen in the significantly fewer background responses made on the SVFB in the post-testing.

Social growth and development, as measured by the Vineland Scale of Social Maturity social quotients, showed a significant increase in the rate of development for all of the children. Improvement in the development of social skills seemed to be independent of placement in a control or experimental group.

Adequate evaluation of the academic achievement made by the children during the course of the year was not possible as only 12 of the children were able to perform on all or part of the achievement test at the beginning of the school year. Failure to perform on the achievement test was due to inability to read, and/or hyperactivity and attention difficultues. By the end of the year, however, all of the children were able to perform on at least part of the achievement test, and 25 were able to perform on all of it.

At the beginning of the project, it was generally agreed among the diagnostic staff that one academic year was not enough time to see the maximum growth and development which might be expected to occur as a result of the experimental procedures. For instance, it was felt by some in special education that the IQ's of this particular type of child would increase as a result of the special education experience. The present data lend no support for this belief, although isolated children did show major gains. (The pre-test mean Binet IQ was 80.39, and the post-test mean IQ was 80.23.)

Much has been written of the relationship of perceptual difficulties to learning problems. In light of this, it is interesting to note that the main influence of the experimental conditions was to increase visual-perceptual performance. All of the children in the project received perceptual training, but the children in non-stimulating environments made significantly more growth in this ability than did the children in control classrooms.

In order to assess adequately the long-term effects of the experimental conditions, as well as the value of the specialized methodology, it would be necessary to evaluate these children again at some future time, preferably after an interval of one or two years.

Twelve Month Follow-up

An additional grant was made by the Eugene and Agnes E. Meyer Foundation which enabled the collection of further psychological and educational test data covering the academic year 1958-1959. Pre-test and post-test refer to the testing done prior to or at the beginning (1957) and end (1958) of the project year, respectively. Follow-up (1959) refers to the test data made possible by the above mentioned Meyer Foundation grant.

Follow-up I

The Follow-up I psychological and educational test battery consisted of:

Stanford-Binet, Form L
Bender-Gestalt
Syracuse Visual Figure Background Test
Goodenough Draw-a-Person
Block Design and Coding from the WISC
Vineland Scale of Social Maturity
Stanford Achievement Test

The Stanford Achievement Test was administered individually to each child by a special education teacher[1] whose full-time services during the month of May and part of June were contributed by the Montgomery County Board of Education. The psychological tests were administered during the period from June 3 to July 6, 1959.

The test results are included for the second year grouping, which are noted on the tables as Grouping II. Each class in the second year grouping had a core of 4 to 5 children carried over from the preceding year, and the remainder were shifted from the other project classes, or new children were brought in from other special education classes. The statistics presented in this chapter are based only on those children who had been in the original project.

---

[1] Miss Mary Morningstar, Department of Special Education, Montgomery County Board of Education.

None of the second year grouping classes had modified physical environments, and all of the teachers were free to vary teaching techniques as they saw fit. No attempt was made to insure close adherence to the highly structured teaching techniques of the project year. One of the control teachers from the project year was not available to special education during the second year, and was replaced by a teacher who had had experience working with children of the type included in the project.

It was felt desirable to make a comparison of the control and experimental groups during the second year, even though the actual class placement had been changed, in order to assess the impact of the experiences during the project year on subsequent psychological and achievement test results. A number of children had moved from the area or were for other reasons unavailable for testing. The statistics for the pre-test and post-test as reported in the following tables were computed on the basis of the number of children from the original project remaining in the four classes at the end of the second year.

Statistical analyses of the test results are presented in the following order:

1. comparison of the experimental and control classes,
2. test results of the classes as they were composed during the second year.

Stanford Binet

Table 78 shows the means, standard deviations, _t_-tests, and probabilities of chance differences in means for the

TABLE 78

MEANS, STANDARD DEVIATIONS, t-TESTS, AND PROBABILITIES OF CHANCE DIFFERENCES IN MEANS FOR THE STANFORD-BINET: INTELLIGENCE QUOTIENTS

Class	N	Pre-test		Post-test		Follow-up I		Follow-up I and	
		$\overline{X}$	σ	$\overline{X}$	σ	$\overline{X}$	σ	Post-test t	Pre-test t
C-1	10	80.20	11.58	80.00	14.16	80.10	14.43	.04	.04
C-2	9	79.33	11.20	80.44	9.37	79.22	12.24	.42	.06
E-1	8	81.63	12.03	78.25	10.38	79.25	10.88	.85	1.45
E-2	8	82.00	15.67	83.25	15.04	82.25	19.77	.43	.08
Total	35	80.71	12.68	80.46	12.62	80.17	14.69	.25	.49

Stanford-Binet intelligence quotients. The figures for the pre-test and post-test are based on the number of children who remained in the project for the entire two-year period. As can be seen, the mean IQ is remarkably consistent, being 80.71 in the pre-test, 80.46 in the post-test, and 80.17 in the Follow-up I.

Comparison of the combined control and combined experimental groups is shown in Table 79. No statistically significant differences in means occurred, again reflecting the very careful matching of these children. Table 80 shows the means, standard deviations, and t-tests for the children as they were grouped during the second year.

Table 81 shows the age range on the Stanford-Binet for the three testing periods. At the end of the project year a statistically significant difference had been found between the Form L administered at the beginning of the year, and the Form M

TABLE 79

MEANS, STANDARD DEVIATIONS, t-TESTS, AND PROBABILITIES OF CHANCE DIFFERENCES IN MEANS FOR THE COMBINED CONTROL AND EXPERIMENTAL GROUPS FOR THE STANFORD-BINET INTELLIGENCE QUOTIENTS

Group	N	$\overline{X}$	σ	t[a]
Combined Control Groups, Follow-up I	19	79.68	13.44	.19
Combined Experimental Groups, Follow-up I	16	80.75	16.03	
Comparison of Control Group, Pre-test, and Control Group, Follow-up I	19	-.11	6.18	.07
Comparison of Control Group Post-test, and Control Group, Follow-up I	19	-.53	7.66	.29
Comparison of Experimental Group, Pre-test, and Experimental Group, Follow-up I	16	-1.06	6.64	.62
Comparison of Experimental Group, Post-test, and Experimental Group, Follow-up I	16	.19	5.53	.00

[a] t-test computed on basis of paired observations. The mean and standard deviation reported on are based on the differences between pairs of observations.

administered at the end. The mean age range in the pre-test was 5.26, in the post-test 4.57. At the time it was felt that this might reflect an improvement in the children in handling tasks at the low end of the scale, i.e., that the specialized teaching methodology might have "filled in" the developmental tasks that caused failures in the lower age levels. This interpretation is not possible from the results at the end of the second year,

TABLE 80

MEANS, STANDARD DEVIATIONS, AND *t*-TESTS OF THE SIGNIFICANCE OF DIFFERENCES BETWEEN MEANS FOR THE GROUPING II STANFORD-BINET: INTELLIGENCE QUOTIENTS

Group	N	Pre-test		Post-test		Follow-up I		Follow-up I and	
		$\bar{X}$	σ	$\bar{X}$	σ	$\bar{X}$	σ	Post-test *t*	Pre-test *t*
A	8	88.88	14.53	86.00	14.41	89.88	16.63	1.76	.37
B	10	72.90	8.81	74.10	9.52	70.90	8.63	3.49**	
C	9	81.67	11.66	81.22	9.52	80.89	12.78	.11	.44
D	7	78.29	6.50	77.29	6.18	77.29	10.07	.00	.39

$^{**}p < .01$

shown in Table 81. These results show a significant increase in age range when comparing the post-test and the Follow-up I

TABLE 81

MEANS, STANDARD DEVIATIONS, AND *t*-TESTS OF THE SIGNIFICANCE OF DIFFERENCES BETWEEN MEANS FOR THE STANFORD-BINET: AGE RANGE

Class	N	Pre-test		Post-test		Follow-up I		Follow-up I and	
		$\bar{X}$	σ	$\bar{X}$	σ	$\bar{X}$	σ	Post-test *t*	Pre-test *t*
C-1	10	5.30	1.49	5.10	1.58	5.90	1.81	1.44	.90
C-2	9	5.22	1.31	3.89	1.29	5.11	1.10	3.77**	.17
E-1	8	5.38	.86	4.50	.77	5.38	.99	2.49*	.00
E-2	8	5.13	1.54	4.75	1.20	5.50	1.58	1.43	.81
Total	35	5.26	1.34	4.57	1.34	5.49	1.46	4.12**	.79

$^{**}p < .01$

$^{*}p < .05$

for the total group of children, and for two individual classes (C-2 and E-1). The mean age range on the Follow-up I Stanford-Binet, Form L, for the total group of children was 5.49, as contrasted to 4.57 on the post-test Form M. In the two administrations of the Form L, the age range means are extremely close, the pre-test being 5.26, the Follow-up I, 5.49. Thus, the mean age range on the Form M seems to be at variance with the means on the Form L.

Table 82 shows comparison of the combined control and combined experimental groups.

TABLE 82

MEANS, STANDARD DEVIATIONS, t-TESTS, AND PROBABILITIES OF CHANCE DIFFERENCES IN MEANS FOR THE COMBINED CONTROL AND EXPERIMENTAL GROUPS ON THE STANFORD-BINET: AGE RANGE

Group	N	$\bar{X}$	σ	t
Combined Control Groups, Follow-up I	19	5.53	1.57	.17
Combined Experimental Groups, Follow-up I	16	5.44	1.32	
Comparison of Control Group, Pre-test, and Control Group, Follow-up I	19	.21	2.01	.56
Comparison of Control Group, Post-test, and Control Group, Follow-up I	19	1.00	1.38	3.09**
Comparison of Experimental Group, Pre-test, and Experimental Group, Follow-up I	16	.19	1.24	.59
Comparison of Experimental Group, Post-test, and Experimental Group, Follow-up I	16	.81	1.18	2.66****

**$p < .01$

****$p < .02$

Table 83 shows second year grouping.

TABLE 83

MEANS, STANDARD DEVIATIONS, AND t-TESTS OF THE SIGNIFICANCE OF DIFFERENCES BETWEEN MEANS FOR THE GROUPING II STANFORD BINET: AGE RANGE

Group	N	Pre-test		Post-test		Follow-up I		Follow-up I and Post-test
		$\overline{X}$	σ	$\overline{X}$	σ	$\overline{X}$	σ	t
A	8	6.00	1.06	4.50	.87	6.00	1.17	3.97**
B	10	4.40	1.11	4.50	1.20	4.70	1.00	.61
C	9	5.44	1.34	4.56	1.26	6.00	1.63	3.51**
D	7	5.00	.76	4.14	.99	5.00	1.19	1.23

**$p < .01$

The mean mental ages and standard deviations for the original grouping are shown in Table 84, and for the second year grouping in Table 85. It is evident from these tables that the variability of mental ages was much greater in the second year grouping than at the beginning of the project.

The drawing of a diamond still proved to be an extremely difficult item at the end of the second year, even though perceptual training had been an integral part of the teaching approach during the two-year period. In the pre-test, 7 of the 39 children passed this item on the Stanford-Binet, Form L, at the 7 year level. In the Follow-up I Stanford Binet, Form L, 7 children again passed this item. It should be noted, however, that only 3 children passed this item on both the pre-test and Follow-up I. For comparison, the mean age for all the project

TABLE 84

MEANS AND STANDARD DEVIATIONS FOR THE STANFORD-BINET MENTAL AGES, ORIGINAL GROUPING

Class	Pre-test			Post-test			Follow-up I		
	N	$\bar{X}$	σ	N	$\bar{X}$	σ	N	$\bar{X}$	σ
C-1	10	80.60	13.08	10	89.60	16.66	10	100.10	19.49
C-2	10	80.10	14.69	10	91.40	13.89	9	97.00	17.05
E-1	10	73.50	10.35	10	80.70	13.68	8	95.25	13.11
E-2	9	78.89	16.39	9	88.67	20.11	8	100.75	26.91
Total	39	78.26	14.03	39	87.56	16.71	35	98.34	19.82

TABLE 85

MEANS AND STANDARD DEVIATIONS FOR THE STANFORD-BINET MENTAL AGES, GROUPING II

Group	Pre-test			Post-test			Follow-up I		
	N	$\bar{X}$	σ	N	$\bar{X}$	σ	N	$\bar{X}$	σ
A	9	84.67	16.39	9	92.11	18.31	8	112.50	19.12
B	10	71.50	8.99	10	80.60	13.57	10	86.30	13.93
C	9	81.22	13.85	9	90.00	11.89	9	100.11	17.59
D	7	73.14	7.94	7	81.71	8.71	7	92.00	14.46

children was 10-0, and the mean IQ was 80.17. The mean age of the 7 children who passed the diamond drawing item on the Follow-up I, Form L, was 8-6, and the mean IQ was 89.43. Five had normal EEG's.

Summary

Is the significant difference in age range between the pre-test and post-test, and post-test and Follow-up I, due to changes in the intellectual functioning of the children, or is this difference the result of using two forms of the same test? In the standardization of the Stanford-Binet, the Form L and Form M correlate very highly, and in clinical practice are considered equivalent scales. Many clinicians have felt for some time, however, that a revision should be made because a few of the items are generally considered to be obsolete. Although the over-all intelligence quotients from these two scales are, for all practical purposes, identical, it should be noted that the two scales are not composed of exactly the same items. For example, at the 7-year level on the Form M there is no item that would correspond *exactly* to the diamond drawing item on the Form L at the same year level. As was pointed out earlier, this item proved extremely difficult for the project children, only 7 children passing the item on either the pre-test or Follow-up I. If a child passed all items at the year 7 level except the diamond drawing, his age range would automatically be extended one year, the basal age then being at the year 6 level rather than at the year 7. Similarly, several items at the upper end of the scale may be somewhat too easy, which could result in augmenting the age range by raising the ceiling. Thus, the differences noted in Table 81 could be merely an artifact of the internal construction of the scales.

Although there was some variability of individual IQ's, the mean IQ for the total group was very consistent for each of the three test administrations.

Many teachers who work with retarded children arrive at a position of distrust of the conventional measures of intelligence. Too frequently the child who performs at a very low level on such tests expresses considerable, and often surprising, performance in various areas not ordinarily associated with "book learning." A "retarded" child may exhibit competency of a high order in tasks involving mechanical aptitude, or show a highly aesthetic sense when working with various art media. The next step is to discard the intelligence measures as meaningless, or not really being important.

It is not the purpose here to criticize intelligence tests. Others have done a highly competent job in this respect. It has been pointed out that the tests do not take into account enough of the known or suspected factors isolated in factor analytic studies, and that little or no attempt has been made to correlate the processes involved in test performance with non-test problem solving. Whether or not the tests measure "real intelligence" is a problem to be answered through other investigations. One cannot escape the conclusion, however, that the tests do correlate highly with one form of intellectual activity that our society imposes upon its members, namely, the activities and processes that make possible success within the school situation.

Masland, Sarason, and Gladwin (44) pointed out that many of the children diagnosed as having borderline intelligence are labelled and treated as mentally retarded only within the context of the public school system; after passing the compulsory school age, many of these children "pass" into the normal population, and lose the stigma of the earlier retardation label. The academic milieu, then, may be the only intellectual hurdle which such an individual will face within his lifetime. A search for a way of helping such children get over this hurdle would be justification enough for the present project.

Goodenough Intelligence Test

The means, standard deviations, and _t_-tests for the Goodenough IQ's are presented in Table 86. As can be seen, no statistically significant differences between pre-test, post-test, or Follow-up I occurred, either for individual classes, or the total group of children.

TABLE 86

MEANS, STANDARD DEVIATIONS, AND _t_-TESTS OF SIGNIFICANCE OF DIFFERENCES BETWEEN MEANS FOR THE GOODENOUGH IQ's

Class	N	Pre-test		Post-test		Follow-up I		Follow-up I and	
		$\bar{X}$	σ	$\bar{X}$	σ	$\bar{X}$	σ	Post test _t_	Pre-test _t_
C-1	9	82.22	19.79	84.00	12.56	79.89	16.05	.97	.56
C-2	9	71.89	12.68	76.00	12.34	69.56	13.72	.95	.37
E-1	8	73.13	9.06	76.63	11.37	70.50	15.12	1.26	.36
E-2	8	85.13	10.69	74.38	11.60	76.13	16.87	.36	2.76
Total	34	78.03	15.45	77.88	12.58	74.06	16.03	1.56	1.49

Table 87 shows a comparison of the combined control and combined experimental groups. Again, no statistically significant differences were noted.

TABLE 87

MEANS, STANDARD DEVIATIONS, t-TESTS, AND PROBABILITIES OF CHANCE DIFFERENCES IN MEANS FOR THE CONTROL AND EXPERIMENTAL GROUPS ON THE GOODENOUGH INTELLIGENCE TEST IQ's

Group	N	$\bar{X}$	σ	$\underline{t}$
Combined Control Groups, Follow-up I	18	74.72	15.80	.24
Combined Experimental Groups, Follow-up I	16	73.31	16.26	
Comparison of Control Group, Pre-test, and Control Group, Follow-up I	18	-2.33	17.41	.64
Comparison of Control Group, Post-test, and Control Group, Follow-up I	18	-5.28	13.08	1.52
Comparison of Experimental Group, Pre-test, and Experimental Group, Follow-up I	16	-5.81	12.81	1.47
Comparison of Experimental Group, Post-test, and Experimental Group, Follow-up I	16	-2.19	11.54	.63

Table 88 shows the means, standard deviations, and $\underline{t}$-test between the post-test and Follow-up I for the second year grouping. No significant differences were noted.

TABLE 88

MEANS, STANDARD DEVIATIONS, AND *t*-TESTS OF THE SIGNIFICANCE OF DIFFERENCES BETWEEN MEANS FOR THE GROUPING II *GOODENOUGH IQ's*

Group	N	Pre-test		Post-test		Follow-up I		Follow-up I and Post-test
		$\bar{X}$	σ	$\bar{X}$	σ	$\bar{X}$	σ	*t*
A	8	71.50	13.80	78.88	8.71	79.25	13.75	.12
B	10	82.60	11.93	76.90	10.68	72.70	17.22	.09
C	9	76.22	17.13	78.11	10.71	75.78	17.33	.38
D	7	81.29	16.15	77.86	19.21	69.00	10.70	2.04

Summary

Machover (44) has devoted considerable attention to describing the personality dynamics involved in drawing the human figure. Without becoming involved in a complete analysis of the drawings from this point of view, it should be pointed out that these children at the end of the 2-year period produced drawings that were in marked contrast to those produced in the pre-test period. True, some of the children continued to produce bizarre, distorted figures considerably below that expected from this age level, but even these few drawings are considerably better than at the beginning of the project. It might be posited that with increasing personality integration, as noted in the psychiatric reports, there is a corresponding integration in the body image as projected in this test. The improvement in drawing, however, cannot be attributed to any one factor. In addition to the academic experiences of the children, maturational and developmental factors may be assumed to play a role. The ratio of mental age, scored according to the Goodenough criteria, to the chronological age is very consistent. The perceptual training given the children did not result in an increase in this ratio.

Block Design and Coding from Wechsler Intelligence Scale for Children

Block Design

A comparison of the pre-test and Follow-up I results is presented in Table 89. As can be seen from the table, the mean equivalent test age for each individual class, as well as the mean for the total group of children, was significantly higher at the end of the second year. Table 90 shows a comparison of

TABLE 89

MEANS, STANDARD DEVIATIONS, AND *t*-TESTS OF SIGNIFICANCE OF DIFFERENCES BETWEEN MEANS FOR THE WECHSLER INTELLIGENCE SCALE FOR CHILDREN SUBTEST: BLOCK DESIGN

Class	N	Pre-test		Follow-up I		*t*
		$\bar{X}$	σ	$\bar{X}$	σ	
C-1	10	73.60	12.32	103.40	18.20	5.55^{**}
C-2	9	75.33	22.07	113.11	41.90	4.95^{**}
E-1	7	64.86	11.05	121.14	33.33	3.39^{****}
E-2	8	78.50	13.03	115.50	42.56	2.65^{*}
Total	34	73.41	16.15	112.47	35.48	7.43^{**}

$^{**}p < .01$

$^{****}p < .02$

$^{*}p < .05$

TABLE 90

MEANS, STANDARD DEVIATIONS, t-TESTS, AND PROBABILITIES OF CHANCE DIFFERENCES IN MEANS FOR THE COMBINED CONTROL AND EXPERIMENTAL GROUPS ON THE WECHSLER INTELLIGENCE SCALE FOR CHILDREN
SUBTEST: BLOCK DESIGN

Group	N	$\overline{X}$	σ	t
Combined Control Groups, Follow-up I	19	108.00	32.09	.78
Combined Experimental Groups, Follow-up I	15	118.13	38.63	
Comparison of Control Group, Pre-test, and Control Group, Follow-up I	19	33.58	19.32	7.37**
Comparison of Experimental Group, Pre-test, and Experimental Group, Follow-up I	15	43.07	39.31	4.38**

$^{**}p < .01$

the combined control and combined experimental groups. Although there was not a statistically significant difference between the combined control and combined experimental groups as such, each combined group had a significantly higher mean equivalent test age at the end of the second year than in the pre-test. Table 91 shows the statistics for the second year grouping.

Coding

Table 92 shows a comparison of the pre-test and Follow-up I mean equivalent test age for the Coding test considered individually by classes as well as for the total group of children.

TABLE 91

MEANS, STANDARD DEVIATIONS, t-TESTS, AND PROBABILITIES OF CHANCE DIFFERENCES IN MEANS FOR THE WECHSLER INTELLIGENCE SCALE FOR CHILDREN, GROUPING II. SUBTEST: BLOCK DESIGN (EQUIVALENT TEST AGE IN MONTHS)

Group	N	Pre-test		Follow-up I		t
		$\overline{X}$	σ	$\overline{X}$	σ	
A	8	72.50	15.22	110.75	29.12	4.30^{**}
B	10	70.80	12.37	110.80	42.73	2.68^{*}
C	8	77.00	18.08	114.25	31.63	3.97^{**}
D	7	73.43	19.53	113.43	36.00	5.56^{**}

$^{**}p < .01$
$^{*}p < .05$

TABLE 92

MEANS, STANDARD DEVIATIONS, t-TESTS, AND PROBABILITIES OF CHANCE DIFFERENCES IN MEANS FOR THE WECHSLER INTELLIGENCE SCALE FOR CHILDREN. SUBTEST: CODING (EQUIVALENT TEST AGE IN MONTHS)

Class	N	Pre-test		Follow-up I		t
		$\overline{X}$	σ	$\overline{X}$	σ	
C-1	8	79.00	22.85	94.75	32.95	1.44
C-2	9	69.56	12.85	78.90	12.90	1.32
E-1	7	66.00	8.28	84.85	7.32	3.35^{****}
E-2	8	81.50	15.93	91.75	15.21	2.97^{*}
Total	32	74.13	17.18	87.38	20.68	3.68^{**}

$^{**}p < .01$
$^{****}p < .02$
$^{*}p < .05$

Two of the experimental groups had statistically significantly higher mean equivalent test ages, as did the total group of children, but the control groups did not. Table 93 shows a comparison of the combined control and combined experimental groups.

TABLE 93

MEANS, STANDARD DEVIATIONS, t-TESTS AND PROBABILITIES OF CHANCE DIFFERENCES IN MEANS FOR THE COMBINED CONTROL AND EXPERIMENTAL GROUPS ON THE WECHSLER INTELLIGENCE SCALE FOR CHILDREN: CODING (EQUIVALENT TEST AGE IN MONTHS)

Group	N	$\overline{X}$	σ	t
Combined Control Groups, Follow-up I	17	86.35	25.72	
Combined Experimental Groups, Follow-up I	15	88.53	12.66	.30
Comparison of Control Group, Pre-test, and Control Group, Follow-up I	17	10.59	25.69	1.92
Comparison of Experimental Group, Pre-test, and Experimental Group, Follow-up I	15	14.27	12.33	4.33**

**$p < .01$

Although there was not a significant difference between the combined control and combined experimental groups as such, the combined experimental group had a significantly higher equivalent test age on the Follow-up I test, while the combined control goup did not. Table 94 shows the scores for the second year grouping.

TABLE 94

MEANS, STANDARD DEVIATIONS, t-TESTS, AND PROBABILITIES OF CHANCE DIFFERENCES IN MEANS FOR THE WECHSLER INTELLIGENCE SCALE FOR CHILDREN, GROUPING II. SUBTEST: CODING (EQUIVALENT TEST AGE IN MONTHS)

Group	N	Pre-test		Follow-up I		t
		$\overline{X}$	σ	$\overline{X}$	σ	
A	8	78.00	14.70	78.00	13.45	.00
B	8	78.00	15.59	88.00	19.10	3.37^{****}
C	8	80.00	22.43	93.00	26.06	1.79
D	7	66.57	9.90	83.71	6.71	3.73^{**}

$^{**}p < .01$
$^{****}p < .02$

Summary

The equivalent test age is the WISC equivalent of the mental age obtained on the Stanford-Binet Intelligence Test. It is interesting to note how similar the mean equivalent test ages on the Block Design test are to the mean Stanford-Binet mental ages on the pre-test, where the mean equivalent test age was 6.12 years, and the mean Stanford-Binet mental age was 6.52. At the end of the second year, however, the mean equivalent test age had increased a full year above the mean mental age, the equivalent test age being 9.57 years, and the mean mental age 8.20. These results are quite consistent with the perceptual training given the project children, where parquetry blocks, and other instructional block designs, were used. Thus, the children had experienced intensive drill in the processes measured by the test.

As noted above, training may be assumed to have played a very important part in the improvement of the total group of children on the Block Design, but this was not as true of the Coding test, where there was no close counterpart in the materials used in the perceptual training program. In the pre-test the Coding mean equivalent test age was 6.12 years, the mean Stanford-Binet mental age, 6.52. On the post-test the Coding mean equivalent test age was 7.28 years, and the mean Stanford-Binet mental age was 8.20.

The effect of perceptual training can be seen on these two subtests from the WISC. Where instructional materials were quite similar to the WISC items, test performance was a full year above the Stanford-Binet mental age. Where the children had not had intensive training with similar instructional materials, test performance was a full year below the Stanford-Binet mental age.

The significantly higher equivalent test age of the combined experimental group may be attributed in part to the relatively greater emphasis in the instruction of these classes on perceptual training. In all four classes perceptual training was an important part of the program, but there was somewhat greater freedom to vary instruction in the control classes.

Bender-Gestalt

Perseveration

Table 95 shows the means, standard deviations, and *t*-tests of the significance of differences between means for the

TABLE 95

MEANS, STANDARD DEVIATIONS, t-TESTS, AND PROBABILITIES OF CHANCE DIFFERENCES IN MEANS FOR THE NUMBER OF PERSEVERATIONS ON THE BENDER-GESTALT TEST, FOR THE EXPERIMENTAL AND CONTROL GROUPS

Class	N	Pre-test		Post-test		Follow-up I		Follow-up I and	
		$\bar{X}$	σ	$\bar{X}$	σ	$\bar{X}$	σ	Post-test t	Pre-test t
C-1	10	1.50	1.08	1.80	.92	.90	1.29	1.49	1.26
C-2	9	1.89	2.17	1.44	1.13	1.56	2.12	.21	.71
E-1	6	1.83	1.33	1.50	1.05	1.67	.52	.58	.28
E-2	8	1.50	1.51	1.50	1.20	.88	.80	1.18	1.05
Total	33	1.67	1.19	1.58	1.03	1.21	1.14	1.32	1.79

Bender-Gestalt category Perseveration, for the total group of children as well as each control and experimental class. There were no statistically significant differences either between the means of the pre-test and Follow-up I or between the post-test and Follow-up I. Table 96 shows the results of the statistical analysis of the combined control and combined experimental groups. No significant differences were noted. Table 97 shows the statistics for the second year grouping, and, again, no significant differences were noted.

The conclusion can be made from these data that there were no differences between the experimental and control groups on this scoring category. The children who were in the more structured teaching situation of the experimental groups did not improve in perseveration during the project proper, nor was

TABLE 96

MEANS, STANDARD DEVIATIONS, t-TESTS, AND PROBABILITIES OF CHANCE DIFFERENCES IN MEANS FOR THE CONTROL AND EXPERIMENTAL GROUPS ON THE BENDER-GESTALT TEST: PERSEVERATIONS

Group	N	$\overline{X}$	σ	t
Combined Control Groups, Follow-up I	19	1.21	1.32	.01
Combined Experimental Groups, Follow-up I	14	1.21	.77	
Comparison of Control Group, Pre-test, and Control Group, Follow-up I	19	-.47	1.39	1.44
Comparison of Control Group, Post-test, and Control Group, Follow-up I	19	-.42	1.76	1.02
Comparison of Experimental Group, Pre-test, and Experimental Group, Follow-up I	14	-.43	1.50	1.03
Comparison of Experimental Group, Post-test, and Experimental Group, Follow-up I	14	-.29	1.22	.85

there any differential progress when assigned to different classes the second year. These results are in disagreement with the teachers' feeling that the children, as a total group, showed a reduction in perseveration over the two-year period. It may well be, however, that perseveration as seen on the Bender-Gestalt Test, which may be considered a simple motor perseveration, may not be the same type of perseveration with which the teachers are most concerned as a teaching problem, which may be more of a process perseveration.

TABLE 97

MEANS, STANDARD DEVIATIONS, AND t-TESTS OF THE SIGNIFICANCE OF DIFFERENCES BETWEEN MEANS FOR THE GROUPING II BENDER-GESTALT TEST: PERSEVERATION

Group	N	Pre-test		Post-test		Follow-up I		Follow-up I and Post-test
		$\bar{X}$	σ	$\bar{X}$	σ	$\bar{X}$	σ	t
A	8	1.88	1.36	2.00	2.18	1.13	1.05	1.08
B	10	1.40	1.28	1.80	1.08	1.20	1.17	.97
C	8	1.38	.99	1.50	1.00	1.38	1.41	.21
D	6	2.17	.69	1.83	.69	1.33	.47	1.46

Form Dissociation

Table 98 shows the means, standard deviations, and *t*-tests of the differences between means for the Bender-Gestalt

TABLE 98

MEANS, STANDARD DEVIATIONS, t-TESTS, AND PROBABILITIES OF CHANCE DIFFERENCES IN MEANS FOR THE NUMBER OF FORM DISSOCIATIONS ON THE BENDER-BESTALT TEST, FOR THE EXPERIMENTAL AND CONTROL GROUPS

Class	N	Pre-test		Post-test		Follow-up I		Follow-up I and	
		$\bar{X}$	σ	$\bar{X}$	σ	$\bar{X}$	σ	Pre-test t	Post-test t
C-1	10	2.90	1.91	2.40	1.78	2.20	1.62	.42	1.04
C-2	9	2.89	1.36	1.89	1.45	1.67	.81	.48	2.63*
E-1	6	3.00	1.67	2.17	1.47	1.83	1.60	.68	1.12
E-2	8	3.13	2.36	1.25	1.04	1.63	1.77	.67	1.62
Total	33	2.97	1.78	1.88	1.56	1.85	1.44	.01	3.06**

$^{**}p < .01$

$^{*}p < .05$

category Form Dissociation. At the conclusion of the project year one experimental class (E-1) had shown significant improvement on this category ($p < .05$), but this gain was not maintained when the children were assigned to different classes the second year. None of the control or experimental classes made significant gains on this category during the second year class assignment (comparison of post-test and Follow-up I), nor did the entire group of children make gains during this second year. The improvement made by the entire group the first year was maintained, however, as may be seen in comparing the differences between the pre-test and Follow-up I, where one class (C-2) made significant progress ($p < .05$), and the children considered as a total group showed an over-all gain.

Table 99 shows comparison of the combined control and combined experimental groups. At the conclusion of the project year, both the combined control groups and combined experimental groups had made significantly fewer errors in form dissociations. When considering the pre-test and Follow-up I results, however, only the control groups maintained their gains ($p < .05$).

Table 100 shows the results of the second year grouping. None of the new class groups made significant gains on this category when comparing the post-test with the Follow-up I.

Failure of the children to make gains the second year is not surprising as the intensive perceptual training occurred during the first year. Also, the highly structured environment and teaching approach had been modified the second year. The gains that had been made during the first year tended to be maintained, however, even though the teaching emphasis had changed.

TABLE 99

MEANS, STANDARD DEVIATIONS, t-TESTS, AND PROBABILITIES OF CHANCE DIFFERENCES IN MEANS FOR THE CONTROL AND EXPERIMENTAL GROUPS ON THE BENDER-GESTALT TEST: FORM DISSOCIATION

Group	N	$\bar{X}$	σ	t
Combined Control Groups, Follow-up I	19	1.95	1.28	.45
Combined Experimental Groups, Follow-up I	14	1.71	1.58	
Comparison of Control Group, Pre-test, and Control Group, Follow-up I	19	-.84	1.75	2.29*
Comparison of Control Group, Post-test, and Control Group, Follow-up I	19	.00	1.40	.64
Comparison of Experimental Group, Pre-test, and Experimental Group, Follow-up I	14	-1.36	2.41	2.03
Comparison of Experimental Group, Post-test, and Experimental Group, Follow-up I	14	.07	1.39	.18

*p < .05

TABLE 100

MEANS, STANDARD DEVIATIONS, AND t-TESTS OF THE SIGNIFICANCE OF DIFFERENCES BETWEEN MEANS FOR THE GROUPING II BENDER-GESTALT TEST: FORM DISSOCIATION

Group	N	Pre-test		Post-test		Follow-up I		Follow-up I and Post-test
		$\bar{X}$	σ	$\bar{X}$	σ	$\bar{X}$	σ	t
A	8	2.75	1.78	2.38	.99	1.63	1.32	1.43
B	10	3.40	1.56	2.00	1.41	2.70	1.95	1.48
C	8	2.63	1.49	1.50	1.50	1.63	.48	.23
D	6	3.33	2.05	1.83	1.34	1.50	1.26	1.59

Incorrect Elements

At the conclusion of the project year the children who had the control classroom experience actually made more Bender-Gestalt reproductions containing incorrect elements at the end of the academic year than they did at the beginning. This was true at the end of the second year, the control group producing more errors at the end of the second year than they did at the beginning of the project, although this did not reach statistical significance. Neither the experimental nor the control groups considered singly (Table 101) or combined (Table 102) showed significant improvement on this category when comparing the post-test and Follow-up I, or pre-test and Follow-up I. Even when the difference between the means of the pre-test and Follow-up I, and post-test and Follow-up I, for the total group of children were compared, there were no statistically significant differences. As seen in Table 103, the second year grouping did not result in significant improvement in this category between post-test scores and Follow-up I.

TABLE 101

MEANS, STANDARD DEVIATIONS, t-TESTS, AND PROBABILITIES OF CHANCE DIFFERENCES IN MEANS FOR THE NUMBER OF INCORRECT ELEMENTS ON THE BENDER-GESTALT TEST, FOR THE EXPERIMENTAL AND CONTROL GROUPS

Class	N	Pre-test		Post-test		Follow-up I		Follow-up I and	
		$\overline{X}$	σ	$\overline{X}$	σ	$\overline{X}$	σ	Post-test t	Pre-test t
C-1	10	2.10	1.60	3.40	1.08	2.60	1.84	2.06	1.05
C-2	9	2.22	.80	2.33	1.23	2.11	1.36	.51	.18
E-1	6	2.17	1.17	2.17	1.33	1.33	1.37	2.08	1.39
E-2	8	1.63	1.51	1.63	1.06	2.13	1.64	.76	.84
Total	33	2.03	1.29	2.46	1.30	2.12	1.58	1.34	.03

TABLE 102

MEANS, STANDARD DEVIATIONS, t-TESTS, AND PROBABILITIES OF CHANCE DIFFERENCES IN MEANS FOR THE CONTROL AND EXPERIMENTAL GROUPS ON THE BENDER-GESTALT TEST: INCORRECT ELEMENTS

Group	N	$\bar{X}$	σ	t
Combined Control Groups, Follow-up I	19	2.37	2.44	1.05
Combined Experimental Groups, Follow-up I	14	1.79	2.17	
Comparison of Control Group, Pre-test, and Control Group, Follow-up I	19	.21	1.61	.55
Comparison of Control Group, Post-test, and Control Group, Follow-up I	19	-.53	1.23	1.82
Comparison of Experimental Group, Pre-test, and Experimental Group, Follow-up I	14	-.07	1.62	.16
Comparison of Experimental Group, Post-test, and Experimental Group, Follow-up I	14	.07	1.58	.16

TABLE 103

MEANS, STANDARD DEVIATIONS, AND t-TESTS OF THE SIGNIFICANCE OF DIFFERENCES BETWEEN MEANS FOR THE GROUPING II BENDER-GESTALT TEST: INCORRECT ELEMENTS

Group	N	Pre-test		Post-test		Follow-up I		Follow-up I and Post-test
		$\bar{X}$	σ	$\bar{X}$	σ	$\bar{X}$	σ	t
A	8	2.63	1.11	2.75	1.30	1.50	1.50	3.99**
B	10	1.80	1.33	2.80	1.43	2.80	1.72	.50
C	8	1.38	99	2.38	1.22	2.25	1.39	.19
D	6	2.83	.69	2.17	1.04	1.83	1.67	1.59

$^{**}p < .01$

Distorted Angles

Table 104 shows the means, standard deviations, and *t*-tests between means for the Bender-Gestalt category Distorted Angles. When the individual control and experimental classes are examined for evidences of continued progress during the second year placement, only one experimental class (E-2) made significantly fewer errors ($p < .02$). The total group of 33 children, however, made significantly fewer errors at the end of the year ($p < .01$) in comparing post-test and Follow-up I. When a comparison is made between the pre-test scores and Follow-up I, two classes made significantly fewer errors, one control (C-2) and one experimental (E-2), as did the total group of 33 children.

TABLE 104

MEANS, STANDARD DEVIATIONS, *t*-TESTS, AND PROBABILITIES OF CHANCE DIFFERENCES IN MEANS FOR THE NUMBER OF DISTORTED ANGLES ON THE BENDER-GESTALT TEST, FOR THE EXPERIMENTAL AND CONTROL GROUPS

Class	N	Pre-test		Post-test		Follow-up I		Follow-up I and	
		$\overline{X}$	σ	$\overline{X}$	σ	$\overline{X}$	σ	Post-test *t*	Pre-test *t*
C-1	10	2.80	.60	2.90	.74	2.20	.90	2.09	1.97
C-2	9	2.78	.44	2.56	.53	1.89	.60	2.31	4.45**
E-1	6	3.00	.00	2.83	.75	2.33	.82	1.46	3.16*
E-2	8	2.75	1.17	2.75	.89	1.75	1.17	3.06****	3.06****
Total	33	2.82	.68	2.76	.71	2.03	.88	4.61**	5.51**

$^{**}p < .01$
$^{****}p < .02$
$^{*}p < .05$

Table 105 shows the results of the comparison of combined control and combined experimental groups. The difference between the means of the combined control and combined experimental groups was not significant, but the groups considered separately made significant gains on both the pre-test Follow-up I (p < .01), and post-test Follow-up I (p < .01) comparisons.

TABLE 105

MEANS, STANDARD DEVIATIONS, t-TESTS, AND PROBABILITIES OF CHANCE DIFFERENCES IN MEANS FOR THE CONTROL AND EXPERIMENTAL GROUPS ON THE BENDER-GESTALT TEST: DISTORTED ANGLES

Group	N	$\bar{X}$	σ	t
Combined Control Groups, Follow-up I	19	2.05	.76	.17
Combined Experimental Groups, Follow-up I	14	2.00	1.00	
Comparison of Control Group, Pre-test, and Control Group, Follow-up I	19	-.74	.78	3.98**
Comparison of Control Group, Post-test, and Control Group, Follow-up I	19	-.68	.92	3.15**
Comparison of Experimental Group, Pre-test, and Experimental Group, Follow-up I	14	-.86	.83	3.71**
Comparison of Experimental Group, Post-test, and Experimental Group, Follow-up I	14	-.79	.86	3.29**

**p < .01

Table 106 shows the figures for the second year grouping. Two classes made statistically significant fewer errors at the end of the second year, when compared with their post-test results.

TABLE 106

MEANS, STANDARD DEVIATIONS, AND t-TESTS OF THE SIGNIFICANCE OF DIFFERENCES BETWEEN MEANS FOR THE GROUPING II BENDER-GESTALT TEST: DISTORTED ANGLES

Group	N	Pre-test		Post-test		Follow-up I		Follow-up I and Post-test
		$\bar{X}$	σ	$\bar{X}$	σ	$\bar{X}$	σ	t
A	8	2.75	.43	2.75	.43	1.75	.97	2.65*
B	10	2.90	1.04	2.80	.87	2.10	1.14	2.09
C	8	2.75	.43	2.75	.43	2.25	.43	2.65*
D	6	2.83	.37	2.67	.94	2.00	.58	1.58

*p < .05

At the end of the project when the post-testing was done, none of the groups made statistically significant fewer errors on the category of Distorted Angles. By the end of the second year, however, one of the experimental classes had improved significantly on this category, as may be seen in a comparison of the post-test and Follow-up I, and all of the comparisons made of the combined control and combined experimental groups considered separately had made improvement. There was not a significant difference between the control and experimental groups as such on the Follow-up I test results.

Rotations

Table 107 shows the statistical analysis for each control and experimental group considered separately, as well as for the total group. No statistically significant reduction in rotations was noted.

TABLE 107

MEANS, STANDARD DEVIATIONS, t-TESTS, AND PROBABILITIES OF CHANCE DIFFERENCES IN MEANS FOR THE NUMBER OF ROTATIONS ON THE BENDER-GESTALT TEST, FOR THE EXPERIMENTAL AND CONTROL GROUPS

Class	N	Pre-test		Post-test		Follow-up I		Follow-up I and	
		$\overline{X}$	σ	$\overline{X}$	σ	$\overline{X}$	σ	Post test t	Pre-test t
C-1	10	1.20	1.75	.70	.68	.40	.70	.90	1.35
C-2	9	.89	1.17	.89	1.05	1.00	1.32	.19	.24
E-1	6	.67	.82	.50	.84	.83	.98	1.58	.47
E-2	8	1.13	1.25	.63	.52	.38	.74	.68	1.43
Total	33	1.00	1.30	.70	.77	.64	.96	.03	1.36

Table 108 shows a comparison of the combined control and combined experimental classes. Again, no significant reduction in errors was noted, either between the pre-test and Follow-up I, or between the post-test and Follow-up I.

The results from the analysis of the second year grouping are shown in Table 109. One class made significantly fewer rotations at the end of the second year than they did at the end of the project year.

The above analysis is based on only those rotations that varied 45 degrees or more from the standard. The Pascal and Suttell criteria, which weighs various drawing errors and also scores for partial rotations, were also used, and the statistical analyses are shown in Tables 110, 111, and 112. One experimental class (E-1) made significantly fewer errors ($p < .02$) at the end of the second year (comparing post-test and

TABLE 108

MEANS, STANDARD DEVIATIONS, t-TESTS, AND PROBABILITIES OF CHANCE DIFFERENCES IN MEANS FOR THE CONTROL AND EXPERIMENTAL GROUPS ON THE BENDER-GESTALT TEST: ROTATIONS

Group	N	$\bar{X}$	σ	t
Combined Control Groups, Follow-up I	19	.68	1.29	.33
Combined Experimental Groups, Follow-up I	14	.57	.82	
Comparison of Control Group, Pre-test, and Control Group, Follow-up I	19	-.37	1.63	.96
Comparison of Control Group, Post-test, and Control Group, Follow-up I	19	-.11	1.37	.33
Comparison of Experimental Group, Pre-test, and Experimental Group, Follow-up I	14	-.36	1.34	.96
Comparison of Experimental Group, Post-test, and Experimental Group, Follow-up I	14	.00	.84	.00

TABLE 109

MEANS, STANDARD DEVIATIONS, AND t-TESTS OF THE SIGNIFICANCE OF DIFFERENCES BETWEEN MEANS FOR THE GROUPING II BENDER-GESTALT: ROTATIONS

Group	N	Pre-test		Post-test		Follow-up I		Follow-up I and Post-test
		$\bar{X}$	σ	$\bar{X}$	σ	$\bar{X}$	σ	t
A	8	1.13	1.36	.38	.48	1.13	1.27	1.53
B	10	1.10	1.51	.70	.64	.40	.80	.82
C	8	.88	1.27	1.00	1.00	.25	.43	2.54[#]
D	6	.83	.69	.67	.74	.83	.99	.74

[#] $p < .05$

TABLE 110

MEANS, STANDARD DEVIATIONS, AND t-TESTS OF THE SIGNIFICANCE OF DIFFERENCES BETWEEN MEANS FOR THE BENDER-GESTALT TEST: ROTATIONS, SCORED ACCORDING TO THE PASCAL AND SUTTELL CRITERIA

Class	N	Pre-test		Post-test		Follow-up I		Follow-up I and	
		$\bar{X}$	σ	$\bar{X}$	σ	$\bar{X}$	σ	Post test t	Pre-test t
C-1	10	13.40	9.77	13.30	11.41	5.80	4.27	1.74	2.26*
C-2	9	15.11	14.08	13.00	9.89	9.30	8.57	.97	1.39
E-1	6	14.50	11.90	9.67	2.98	3.67	3.30	3.74****	2.35
E-2	8	14.50	13.72	6.38	7.24	8.13	7.03	.74	1.14
Total	33	14.33	12.44	10.88	9.42	6.94	6.61	2.20*	3.43**

TABLE 111

MEANS, STANDARD DEVIATIONS, t-TESTS, AND PROBABILITIES OF CHANCE DIFFERENCES IN MEANS FOR THE CONTROL AND EXPERIMENTAL GROUPS ON THE BENDER-GESTALT TEST: ROTATIONS, SCORED ACCORDING TO PASCAL AND SUTTELL CRITERIA

Group	N	$\bar{X}$	σ	t
Combined Control Groups, Follow-up I	19	7.47	6.89	.53
Combined Experimental Groups, Follow-up I	14	6.21	6.14	
Comparison of Control Group, Pre-test, and Control Group, Follow-up I	19	6.74	12.03	2.61****
Comparison of Control Group, Post-test, and Control Group, Follow-up I	19	5.68	10.72	2.06
Comparison of Experimental Group, Pre-test, and Experimental Group, Follow-up I	14	13.62	4.10	2.19*
Comparison of Experimental Group, Post-test, and Experimental Group, Follow-up I	14	1.57	6.04	.85

$^{\#\#\#\#}p < .02$

$^{\#}p < .05$

TABLE 112

MEANS, STANDARD DEVIATIONS, t-TESTS, AND PROBABILITIES OF CHANCE DIFFERENCES IN MEANS FOR THE GROUPING II BENDER-GESTALT TEST: ROTATIONS, SCORED ACCORDING TO THE PASCAL AND SUTTELL CRITERIA

Group	N	Pre-test		Post-test		Follow-up I		Follow-up I and	
		$\bar{X}$	σ	$\bar{X}$	σ	$\bar{X}$	σ	Post test t	Pre-test t
A	8	13.50	15.31	5.88	5.21	4.75	7.73	.45	2.01
B	10	14.10	13.63	13.80	11.62	8.80	6.95	1.09	1.26
C	8	11.38	7.58	12.88	9.89	8.50	6.65	1.32	.99
D	6	18.50	13.12	10.00	6.51	4.50	4.61	1.43	2.17

Follow-up I), while the other classes made fewer errors, but the t-tests did not reach the confidence level set for this study. The total group of 33 children, however, produced significantly fewer errors ($p < .05$) at the end of the second year for this same comparison. Table 111 shows that a comparison of the combined control and combined experimental groups both made significantly fewer errors at the end of the second year than they did at the end of the project year. Thus, improvement of the children on the number of rotations produced cannot be attributed to the conditions of the experimental classes alone.

Rotations, as was pointed out in the preceding section, are considered an extremely important diagnostic sign by many people who work with the Bender-Gestalt. Most published reports have used a criterion of 45 degrees for rotations. These published reports cannot readily be compared to these results using the Pascal and Suttell scoring system, where partial rotations are considered, i.e., the "handle" of Figure 5 slanting toward the left rather than toward the right. In the scoring system used in this report, partial rotations would more properly be considered in the category of distortion of the configuration. Therefore, these results must be interpreted with caution.

Inadequate Method

Table 113 shows the means, standard deviations, and *t*-tests of the significance of differences between means, pre-test and post-test, for the Bender-Gestalt category, *Inadequate Method*, for the control and experimental classes considered separately. It should be pointed out that this category is a sum of four other categories: Immature, Concrete, Perseveration, and Erratic Approach. None of the individual classes, or the

TABLE 113

MEANS, STANDARD DEVIATIONS, *t*-TESTS, AND PROBABILITIES OF CHANCE DIFFERENCES IN MEANS FOR THE *INADEQUATE METHOD* CATEGORY ON THE BENDER-GESTALT TEST, FOR THE EXPERIMENTAL AND CONTROL GROUPS

Class	N	Pre-test		Post-test		Follow-up I		Follow-up I and	
		$\bar{X}$	σ	$\bar{X}$	σ	$\bar{X}$	σ	Post test *t*	Pre-test *t*
C-1	10	2.80	1.87	2.70	2.50	1.20	1.55	1.77	2.18
C-2	9	3.56	1.94	2.33	1.12	2.56	3.05	.20	1.25
E-1	6	4.33	3.62	3.00	1.07	2.33	1.51	.67	1.17
E-2	8	4.00	2.51	3.38	2.72	1.13	.84	2.05	3.21[####]
Total	33	3.58	2.39	2.82	2.08	1.76	1.99	2.00	3.79[##]

[##] $p < .01$

[####] $p < .02$

total group of children, made significantly fewer errors on this category. In the post-test, one class (E-2) had made significantly fewer errors, and this gain was maintained in the Follow-up I testing ($p < .02$). There was also a significant gain for the total group of children when comparing the pre-test and Follow-up I ($p < .01$).

Table 114 shows a comparison of the combined control and combined experimental groups. There was a significant gain

TABLE 114

MEANS, STANDARD DEVIATIONS, t-TESTS, AND PROBABILITIES OF CHANCE DIFFERENCES IN MEANS FOR THE CONTROL AND EXPERIMENTAL GROUPS ON THE BENDER-GESTALT TEST: INADEQUATE METHOD

Group	N	$\bar{X}$	σ	t
Combined Control Groups, Follow-up I	19	1.84	2.35	.28
Combined Experimental Groups, Follow-up I	14	1.64	1.23	
Comparison of Control Group, Pre-test, and Control Group, Follow-up I	19	-1.32	2.25	2.48*
Comparison of Control Group, Post-test, and Control Group, Follow-up I	19	- .68	3.11	.93
Comparison of Experimental Group, Pre-test, and Experimental Group, Follow-up I	14	-2.50	3.11	2.90**
Comparison of Experimental Group, Post-test, and Experimental Group, Follow-up I	14	-1.57	2.74	2.06

**$p < .01$

*$p < .05$

for both the control ($p < .05$) and experimental ($p < .01$) groups when considering the pre-test and Follow-up I, but there was not a difference between them.

Table 115 shows the second year grouping data. Two classes made significantly fewer errors at the end of the second year than they did at the end of the project year.

TABLE 115

MEANS, STANDARD DEVIATIONS, AND t-TESTS OF THE SIGNIFICANCE OF DIFFERENCES BETWEEN MEANS FOR THE GROUPING II BENDER-GESTALT TEST: INADEQUATE METHOD

Group	N	Pre-test		Post-test		Follow-up I		Follow-up I and Post-test
		$\bar{X}$	σ	$\bar{X}$	σ	$\bar{X}$	σ	t
A	8	4.38	2.55	2.38	1.41	2.63	3.12	.18
B	10	2.90	2.21	3.70	2.87	1.60	1.36	4.36**
C	8	4.13	3.69	2.38	1.22	2.00	1.50	.51
D	6	4.50	2.29	2.83	1.01	1.50	.76	3.16*

$^{**}p < .01$
$^{*}p < .05$

Distortion of Configuration

This category is a combination of six other categories: Dissociation, Closure, Incorrect Elements, Unrecognizable, Distorted Angles, and Rotations. Table 116 shows the statistical analysis of the experimental and control classes considered separately as well as for the total group. One experimental class (E-1) made significantly fewer errors ($p < .01$) at the end of the second year as compared to the post-test results, while the other classes did not. The total group of 33 children made

TABLE 116

MEANS, STANDARD DEVIATIONS, t-TESTS, AND PROBABILITIES OF CHANCE DIFFERENCES IN MEANS FOR THE NUMBER OF DISTORTIONS OF CONFIGURATION ON THE BENDER-GESTALT TEST, FOR THE EXPERIMENTAL AND CONTROL GROUPS

Class	N	Pre-test		Post-test		Follow-up I		Follow-up I and	
		$\overline{X}$	σ	$\overline{X}$	σ	$\overline{X}$	σ	Post-test t	Pre-test t
C-1	10	10.00	4.11	9.70	3.65	7.80	4.54	2.03	1.58
C-2	9	9.89	3.06	7.89	3.55	6.78	1.64	1.35	4.60**
E-1	6	10.83	4.54	8.67	1.21	6.33	2.07	4.20**	2.03
E-2	8	10.00	5.98	7.25	2.61	6.12	4.32	.83	2.19
Total	33	10.12	4.27	8.42	3.09	6.85	3.42	3.25**	4.53**

**$p < .01$

significantly fewer errors ($p < .01$) on this same comparison. Thus, the improvement of the total group of children noted at the end of the project year was continued during the second year in the new class placements.

As shown in Table 117, at the end of the project year the combined experimental group made significantly fewer errors categorized as Distortion of the Configuration, but the combined control group did not show similar progress. At the end of the second year this had been reversed, the combined control group now making significantly fewer errors ($p < .05$), while the combined experimental group did not, when comparing post-test and Follow-up I. It should be noted, however, that on all three tests (pre-test, post-test, and Follow-up I) every class made progressively fewer errors, even though this did not reach the level of confidence accepted in this study.

TABLE 117

MEANS, STANDARD DEVIATIONS, t-TESTS, AND PROBABILITIES OF CHANCE DIFFERENCES IN MEANS FOR THE CONTROL AND EXPERIMENTAL GROUPS ON THE BENDER-GESTALT TEST: DISTORTION OF CONFIGURATION

Group	N	$\bar{X}$	σ	t
Combined Control Groups, Follow-up I	19	7.32	3.34	1.05
Combined Experimental Groups, Follow-up I	14	6.21	3.30	
Comparison of Control Group, Pre-test, and Control Group, Follow-up I	19	-2.63	3.33	3.36^{**}
Comparison of Control Group, Post-test, and Control Group, Follow-up I	19	-1.53	2.62	2.47^{*}
Comparison of Experimental Group, Pre-test, and Experimental Group, Follow-up I	14	-4.14	4.81	3.11^{**}
Comparison of Experimental Group, Post-test, and Experimental Group, Follow-up I	14	-1.64	2.89	2.05

$^{**}p < .01$
$^{*}p < .05$

Table 118 shows second year grouping.

Size

Three categories were summed to make this category: Compression, Enlargement, and Disproportion. At the end of the project year no individual class made significantly fewer errors when comparing the pre-test and post-test. The combined experimental group, however, made significantly fewer errors, while the combined control groups did not.

TABLE 118

MEANS, STANDARD DEVIATIONS, AND t-TESTS OF THE SIGNIFICANCE OF DIFFERENCES BETWEEN MEANS FOR THE GROUPING II BENDER-GESTALT TEST: DISTORTION OF CONFIGURATION

Group	N	Pre-test		Post-test		Follow-up I		Follow-up I and	
		$\bar{X}$	σ	$\bar{X}$	σ	$\bar{X}$	σ	Post-test t	Pre-test t
A	8	10.50	4.69	8.89	2.26	6.00	2.78	4.62^{**}	2.77^{*}
B	10	10.40	4.34	8.90	3.45	8.20	4.81	.56	1.25
C	8	8.62	3.04	7.75	3.46	6.50	1.58	1.30	2.77^{*}
D	6	11.50	4.27	8.33	2.49	6.50	2.29	4.57^{**}	4.33^{**}

$^{**}p < .01$
$^{*}p < .05$

As seen in Table 119, at the end of the second year the total group of 33 children made significantly fewer errors ($p < .01$) when comparing post-test and Follow-up I, as did three classes: one control (C-1), and the two experimental classes.

Table 120 shows a comparison of the combined control and combined experimental groups, both of which made significantly fewer errors ($p < .01$).

Table 121 shows the second year grouping. One class (Class B) made significantly fewer errors the second year.

Total

At the end of the project year the entire group of children made significantly fewer total errors on the post-test as contrasted to the pre-test, as did two individual classes,

TABLE 119

MEANS, STANDARD DEVIATIONS, t-TESTS, AND PROBABILITIES OF CHANCE DIFFERENCES IN MEANS FOR THE SIZE CATEGORY ON THE BENDER-GESTALT TEST, FOR THE EXPERIMENTAL AND CONTROL GROUPS

Class	N	Pre-test		Post-test		Follow-up I		Follow-up I and	
		$\bar{X}$	σ	$\bar{X}$	σ	$\bar{X}$	σ	Post-test t	Pre-test t
C-1	10	2.70	1.34	3.50	2.72	.30	.48	3.75**	5.04**
C-2	9	3.11	2.03	2.78	2.78	1.11	1.62	1.49	2.91****
E-1	6	2.67	2.16	2.17	1.33	.50	.80	2.71*	2.29
E-2	8	2.50	1.69	1.38	1.06	.13	.00	3.99**	3.64**
Total	33	2.76	1.71	2.55	2.27	.52	1.00	4.75**	7.08**

$^{**}p < .01$

$^{****}p < .02$

$^{*}p < .05$

TABLE 120

MEANS, STANDARD DEVIATIONS, t-TESTS, AND PROBABILITIES OF CHANCE DIFFERENCES IN MEANS FOR THE CONTROL AND EXPERIMENTAL GROUPS ON THE BENDER-GESTALT TEST: SIZE

Group	N	$\bar{X}$	σ	t
Combined Control Groups, Follow-up I	19	.68	1.17	1.13
Combined Experimental Groups, Follow-up I	14	.29	.59	
Comparison of Control Group, Pre-test, and Control Group, Follow-up I	19	-2.21	1.73	5.50**
Comparison of Control Group, Post-test, and Control Group, Follow-up I	19	-2.47	2.96	3.54**
Comparison of Experimental Group, Pre-test, and Experimental Group, Follow-up I	14	-2.29	1.91	4.31**
Comparison of Experimental Group, Post-test, and Experimental Group, Follow-up I	14	-1.43	1.12	4.61**

$^{**}p < .01$

TABLE 121

MEANS, STANDARD DEVIATIONS, AND t-TESTS OF THE SIGNIFICANCE OF DIFFERENCES BETWEEN MEANS FOR THE GROUPING II BENDER-GESTALT TEST: SIZE

Group	N	Pre-test		Post-test		Follow-up I		Follow-up I and Post-test
		$\bar{X}$	σ	$\bar{X}$	σ	$\bar{X}$	σ	t
A	8	2.88	2.03	1.63	1.49	.38	.48	2.24
B	10	2.40	1.85	2.20	2.40	.10	.30	2.64*
C	8	3.88	1.51	3.38	2.39	1.13	1.62	1.91
D	6	2.17	.99	2.83	2.27	.67	.75	2.01

$^{*}p < .05$

one control (C-2) and one experimental (E-2). The combined experimental groups also made significantly fewer errors in the post-test period, but the combined control groups did not.

At the end of the second year the entire group of children made significantly fewer errors ($p < .01$) as compared to the post-test (Table 122), as did three individual classes, one control (C-1) and the two experimental classes. Table 123 shows that both the two combined control and two combined experimental classes made significant gains ($p < .01$) at the end of the second year, on comparison of both post-test and Follow-up I, and pre-test and Follow-up I.

Table 124 shows the analysis of the second year groupings. One class made significantly fewer errors at the end of the second year in comparing post-test and Follow-up I.

From these results we can say that the entire group of children made significantly fewer errors at the end of the

TABLE 122

MEANS, STANDARD DEVIATIONS, t-TESTS, AND PROBABILITIES OF CHANCE DIFFERENCES IN MEANS FOR THE TOTAL NUMBER OF ERRORS ON THE BENDER-GESTALT TEST, FOR THE EXPERIMENTAL AND CONTROL GROUPS

Class	N	Pre-test		Post-test		Follow-up I		Follow-up I and	
		X̄	σ	X̄	σ	X̄	σ	Post-test t	Pre-test t
C-1	10	15.50	4.84	15.90	7.26	9.30	5.74	3.48**	4.29**
C-2	9	16.56	4.67	13.00	5.57	10.44	3.01	1.19	4.68**
E-1	6	14.50	6.60	13.83	2.99	9.17	3.19	4.08**	2.25
E-2	8	16.50	8.54	12.00	4.69	6.13	4.55	3.49****	5.02**
Total	33	15.85	5.95	13.79	5.58	8.82	4.50	5.32**	7.89**

**p < .01
****p < .02

TABLE 123

MEANS, STANDARD DEVIATIONS, t-TESTS, AND PROBABILITIES OF CHANCE DIFFERENCES IN MEANS FOR THE CONTROL AND EXPERIMENTAL GROUPS ON THE BENDER-GESTALT TEST: TOTAL

Group	N	X̄	σ	t
Combined Control Groups, Follow-up I	19	9.84	4.33	1.56
Combined Experimental Groups, Follow-up I	14	7.43	4.30	
Comparison of Control Group, Pre-test, and Control Group, Follow-up I	19	6.16	4.04	6.46**
Comparison of Control Group Post-test, and Control Group, Follow-up I	19	-4.68	6.14	3.24**
Comparison of Experimental Group, Pre-test and Experimental Group, Follow-up I	14	-8.21	5.94	4.99**
Comparison of Experimental Group, Post-test and Experimental Group, Follow-up I	14	-5.36	3.81	5.07**

**p < .01

TABLE 124

MEANS, STANDARD DEVIATIONS, AND t-TESTS OF THE SIGNIFICANCE OF DIFFERENCES BETWEEN MEANS FOR THE GROUPING II BENDER-GESTALT TEST: TOTAL ERRORS

Group	N	Pre-test		Post-test		Follow-up I		Follow-up I and Post-test
		$\bar{X}$	σ	$\bar{X}$	σ	$\bar{X}$	σ	t
A	8	15.25	5.47	12.88	4.37	9.00	4.50	2.06
B	10	15.70	6.68	14.80	7.30	8.90	6.09	2.77^*
C	8	14.75	3.70	12.50	6.52	8.75	3.38	1.65
D	6	18.17	6.96	10.50	3.41	8.67	2.43	1.69

$^*p < .05$

project year as well as at the end of the second year. Control and experimental conditions seemed to make little real difference, whatever differences there might have been at the end of the project year being equalized by the end of the second year.

Summary

At the end of the project year the children who had been placed in the experimental rooms made significantly fewer errors than the children in the control classes on six of the ten scoring categories on the Bender-Gestalt. The scoring categories on which improvement was noted were as follows: Incorrect Elements, Rotations, Distortion of the Configuration, Size, Inadequate Method, and Total.

At the end of the second year the children who had had the experimental class experiences the preceding year no longer did significantly better than the control group on a single scoring category. The total group of children, however, did produce significantly fewer errors. The categories on which the total group showed improvement were Distorted Angles, Rotations (scored according to the Pascal and Suttell criteria), Distortion of the Configuration, Size, and Total number of errors.

If the more structured, stimulus-free room made any real difference during the project year, this did not carry over into the succeeding year. The total group of children showed over-all improvement on every one of the scoring categories, although the reduction in errors reached statistical significance on only five of the nine categories. (One category, Immature, was not included in the second year analysis because so few errors were categorized as such.)

It is not possible to ascribe the children's improved ability to draw geometric figures to anything that was done in the educational program worked out for them. It is well known that the Gestalt function follows a maturational course of development, and there is no way of assessing the role of maturation as contrasted to learning from the present data. There is impressive evidence reported in the literature which indicates that the children would have improved with no special training, but it was felt by the teaching staff that this development was greatly enhanced by the educational experience provided them.

Syracuse Visual Figure Background Test

Number Correct

At the end of the project year each group had improved significantly in ability to see pictures flashed tachistoscopically on a screen. Table 125 shows the results for the SVFB at the end of the second year. Both of the control and one experimental group (E-1) saw significantly more correct figures in the Follow-up I test than in the post-test, and one of the experimental groups (E-2) saw a higher mean number of correct respones, but this did not reach the level of confidence accepted in this study. The total group of children saw significantly more correct figures ($p < .01$) on this same comparison.

TABLE 125

MEANS, STANDARD DEVIATIONS, AND t-TESTS OF THE SIGNIFICANCE OF DIFFERENCES BETWEEN MEANS FOR THE SYRACUSE VISUAL FIGURE BACKGROUND TEST: NUMBER CORRECT

Class	N	Pre-test		Post-test		Follow-up I		Follow-up I and	
		$\bar{X}$	σ	$\bar{X}$	σ	$\bar{X}$	σ	Post-test t	Pre-test t
C-1	10	5.40	3.07	7.40	3.32	10.10	2.30	2.83****	5.57**
C-2	9	4.89	2.18	7.44	2.36	9.33	2.79	2.71*	5.67**
E-1	7	2.43	1.76	5.86	2.99	9.00	2.14	3.45****	12.45**
E-2	8	4.00	3.67	7.38	2.74	9.38	4.18	1.76	3.53**
Total	34	4.32	2.99	7.09	2.95	9.50	2.97	5.30**	10.54**

**$p < .01$
****$p < .02$
*$p < .05$

At the beginning of the project year the combined control groups saw significantly more correct figures than did the combined experimental groups, and at the end of the project year the combined experimental groups had improved in ability to the point where this difference was no longer significant. At the end of the second year (Table 126) the combined control groups had a mean number of correct responses of 9.74, the combined experimental group mean being 9.20, and this difference was not

TABLE 126

MEANS, STANDARD DEVIATIONS, *t*-TESTS, AND PROBABILITIES OF CHANCE DIFFERENCES IN MEANS FOR THE COMBINED CONTROL AND EXPERIMENTAL GROUPS ON THE SYRACUSE VISUAL FIGURE BACKGROUND TEST: NUMBER CORRECT

Group	N	$\overline{X}$	σ	*t*
Combined Control Groups, Follow-up I	19	9.74	2.57	.49
Combined Experimental Groups, Follow-up I	15	9.20	3.39	
Comparison of Control Group, Pre-test, and Control Group, Follow-up I	19	4.58	2.39	8.12**
Comparison of Control Group, Post-test, and Control Group, Follow-up I	19	2.32	2.51	3.91**
Comparison of Experimental Group, Pre-test, and Experimental Group, Follow-up I	15	5.93	2.61	7.44**
Comparison of Experimental Group, Post-test, and Experimental Group, Follow-up I	15	2.53	2.73	3.48**

**$p < .01$

significant. Comparison of the combined control and combined experimental groups on a post-test Follow-up I basis shows a significantly higher mean number of correct responses at the end of the second year.

Table 127 shows the statistics for the second year grouping. Two of the grouping II classes made significant gains the second year in comparing the post-test and Follow-up I. The means for all of the groups were significantly higher at the end of the second year as compared to the test results obtained at the end of the project year.

TABLE 127

MEANS, STANDARD DEVIATIONS, AND *t*-TESTS OF THE SIGNIFICANCE OF DIFFERENCES BETWEEN MEANS FOR THE SYRACUSE VISUAL FIGURE BACKGROUND TEST, GROUPING II: NUMBER CORRECT

Group	N	Pre-test		Post-test		Follow-up I		Follow-up I and	
		$\overline{X}$	σ	$\overline{X}$	σ	$\overline{X}$	σ	Post-test t	Pre-test t
A	8	4.38	3.35	7.50	2.83	9.50	3.81	1.01	3.43****
B	10	3.60	2.76	6.20	2.93	9.40	3.47	3.21****	5.36**
C	8	5.75	2.86	8.00	2.83	8.63	3.28	.96	4.87**
D	7	3.57	2.56	6.43	2.82	9.00	2.88	2.96*	9.49**

$^{**}p < .01$
$^{****}p < .02$
$^{*}p < .05$

Background Responses

At the end of the project year the children in the experimental classes saw significantly fewer background responses than at the beginning of the year. The total group of children also saw significantly fewer background responses on a pre-test and post-test comparison.

At the end of the second year (Table 128) there were no statistically significant differences for the individual control and experimental groups, or the total group of children, in comparing the post-test results with the Follow-up I.

TABLE 128

MEANS, STANDARD DEVIATIONS, AND *t*-TESTS OF THE SIGNIFICANCE OF DIFFERENCES BETWEEN MEANS FOR THE SYRACUSE VISUAL FIGURE BACKGROUND TEST: NUMBER OF BACKGROUND RESPONSES

Class	N	Pre-test		Post-test		Follow-up I		Follow-up I and	
		$\bar{X}$	σ	$\bar{X}$	σ	$\bar{X}$	σ	Post-test t	Pre-test t
C-1	10	3.00	2.49	2.00	1.55	1.30	2.47	1.91	1.85
C-2	9	2.44	1.95	2.22	1.62	3.00	2.67	.72	.68
E-1	7	3.57	2.61	2.29	1.38	3.71	1.98	1.64	.19
E-2	8	2.88	2.80	1.00	1.32	.88	.93	.21	1.82
Total	34	2.94	2.50	1.88	1.57	2.15	2.88	.24	1.65

Table 129 shows the comparison of the combined control and combined experimental groups. As can be seen there were no statistically significant differences either on the basis of a comparison of post-test and Follow-up I, or pre-test and Follow-up I.

Results for the second year grouping are shown in Table 130. The second year grouping did not result in statistically significant fewer background responses in comparing the post-test with Follow-up I.

TABLE 129

MEANS, STANDARD DEVIATIONS, t-TESTS, AND PROBABILITIES OF CHANCE DIFFERENCES IN MEANS FOR THE COMBINED CONTROL AND EXPERIMENTAL GROUPS ON THE SYRACUSE VISUAL FIGURE BACKGROUND TEST: NUMBER OF BACKGROUND RESPONSES

Group	N	$\bar{X}$	σ	t
Combined Control Groups, Follow-up I	19	2.11	2.10	.12
Combined Experimental Groups, Follow-up I	15	2.20	2.72	
Comparison of Control Group, Pre-test, and Control Group, Follow-up I	19	-.63	2.79	.96
Comparison of Control Group, Post-test, and Control Group, Follow-up I	19	-.74	2.24	.00
Comparison of Experimental Group, Pre-test, and Experimental Group, Follow-up I	15	-1.00	2.71	1.38
Comparison of Experimental Group, Post-test, and Experimental Group, Follow-up I	15	.60	2.27	1.11

TABLE 130

MEANS, STANDARD DEVIATIONS, AND t-TESTS OF THE SIGNIFICANCE OF DIFFERENCES BETWEEN MEANS FOR THE SYRACUSE VISUAL FIGURE BACKGROUND TEST, GROUPING II: NUMBER OF BACKGROUND RESPONSES

Group	N	Pre-test		Post-test		Follow-up I		Follow-up I and	
		$\bar{X}$	σ	$\bar{X}$	σ	$\bar{X}$	σ	Post-test t	Pre-test t
A	8	3.63	3.12	2.88	1.76	3.75	2.44	.71	.09
B	10	3.40	2.62	1.80	1.83	1.10	1.44	1.77	2.73*
C	8	2.63	1.87	1.50	1.12	2.00	2.40	.63	1.26
D	7	2.00	1.85	1.14	.83	2.57	1.59	2.09	.57

*$p < .05$

Whatever improvement made during the project year in being less distractible by background stimulation did not persist to the end of the second year.

Perseveration

At the end of the project year the total group of children showed significantly fewer perseverative responses than at the beginning of the year, as did one control class (C-1).

In comparing the post-test and Follow-up I results (Table 131), neither the entire group nor a single individual class made significantly fewer perseverative responses during the second year. When comparing the pre-test and Follow-up I, however, the total group had significantly fewer perseverative responses ($p < .01$), as did two classes (C-1, E-1).

TABLE 131

MEANS, STANDARD DEVIATIONS, AND t-TESTS OF THE SIGNIFICANCE OF DIFFERENCES BETWEEN MEANS FOR THE SYRACUSE VISUAL FIGURE BACKGROUND TEST: PERSEVERATIONS

Class	N	Pre-test		Post-test		Follow-up I		Follow-up I and	
		$\overline{X}$	σ	$\overline{X}$	σ	$\overline{X}$	σ	Post-test t	Pre-test t
C-1	10	3.50	2.62	1.10	1.45	.70	1.79	1.50	3.01****
C-2	9	2.11	2.73	1.44	1.89	1.11	2.18	.55	2.27
E-1	7	4.57	3.58	2.57	2.13	1.14	1.73	1.34	2.52*
E-2	8	1.88	2.42	1.38	1.32	1.5	1.85	.50	.14
Total	34	2.97	3.15	1.56	1.79	1.15	1.94	1.24	3.70**

**$p < .01$

****$p < .02$

*$p < .05$

Table 132 shows that at the end of the project year both the combined control and combined experimental groups made significantly fewer perseverative responses. At the end of the second year, however, only the combined control group showed a significant difference between pre-test and Follow-up I.

TABLE 132

MEANS, STANDARD DEVIATIONS, t-TESTS, AND PROBABILITIES OF CHANCE DIFFERENCES IN MEANS FOR THE COMBINED CONTROL AND EXPERIMENTAL GROUPS ON THE SYRACUSE VISUAL FIGURE BACKGROUND TEST: PERSEVERATIONS

Group	N	$\bar{X}$	σ	t
Combined Control Groups, Follow-up I	19	.90	1.99	.81
Combined Experimental Groups, Follow-up I	15	1.47	1.82	
Comparison of Control Group, Pre-test, and Control Group, Follow-up I	17	-2.18	2.41	3.62**
Comparison of Control Group, Post-test, and Control Group, Follow-up I	17	-.41	1.37	1.20
Comparison of Experimental Group, Pre-test, and Experimental Group, Follow-up I	15	-1.67	3.32	1.88
Comparison of Experimental Group, Post-test, and Experimental Group, Follow-up I	15	-.47	2.47	.30

**$p < .01$

Statistics for the second year grouping are shown in Table 133. One class made significantly fewer perseverative responses at the end of the second year as compared to the post-test results.

TABLE 133

MEANS, STANDARD DEVIATIONS, AND t-TESTS OF THE SIGNIFICANCE OF DIFFERENCES BETWEEN MEANS FOR THE SYRACUSE VISUAL FIGURE BACKGROUND TEST, GROUPING II: PERSEVERATIONS

Group	N	Pre-test		Post-test		Follow-up I		Follow-up I and	
		$\bar{X}$	σ	$\bar{X}$	σ	$\bar{X}$	σ	Post-test t	Pre-test t
A	8	1.00	1.00	1.25	1.19	.13	.33	2.83*	2.97*
B	10	3.40	2.65	.90	2.63	1.40	1.69	.81	1.66
C	8	2.50	2.87	1.38	1.87	1.75	2.77	.89	1.66
D	7	3.71	3.28	3.29	2.19	1.43	1.84	1.93	1.66

$^{*}p < .05$

Summary

During the project year each of the two experimental classes had projectors with tachistoscopic attachments available for classroom use. The two control classes did not have projectors regularly assigned to them. An intensive program was not worked out by the experimental class teachers for using the tachistoscopic attachment, but it was occasionally used, and the projector as such was used regularly. Use of a projector with or without a tachistoscopic attachment could influence the results of the SVFB, even if the only learning that occurred was the centering of attention on the screen. Therefore, the improvement of the children in the two experimental classes during the project year must be interpreted with the knowledge that these children had training that the control children did not. It is interesting and important to note, however, that this differential training did not result in permanent improvement in the accuracy of tachistoscopically presented figures, or distractibility by background stimulation.

The total group of children continued to improve in perceptual accuracy on this test during the second year, even when re-assigned to other classes. The children without special training improved as much as the children who did receive such training. This may indicate that maturation or some other unidentified factor played a crucial role in this improvement, rather than perceptual training per se.

Vineland Scale of Social Maturity

Each class during the project year showed a significant increase in social quotient (Table 134), the mean social quotient being 87.15 at the beginning of the year, and 96.94 at the end.

TABLE 134

MEANS, STANDARD DEVIATIONS, t-TESTS, AND PROBABILITIES OF CHANCE DIFFERENCES IN MEANS FOR THE VINELAND SCALE OF SOCIAL MATURITY: SOCIAL QUOTIENTS

Class	N	Pre-test		Post-test		Follow-up I		Follow-up I and	
		$\bar{X}$	σ	$\bar{X}$	σ	$\bar{X}$	σ	Post-test t	Pre-test t
C-1	10	89.20	11.80	97.40	14.11	90.40	15.54	2.55^{*}	.45
C-2	9	83.89	15.71	95.22	10.29	88.89	8.82	4.15^{**}	1.15
E-1	7	87.71	7.59	97.71	5.72	94.57	9.72	2.40	1.87
E-2	8	87.75	9.59	97.63	11.39	91.63	9.90	2.46^{*}	1.13
Total	34	87.15	12.00	96.94	11.18	90.53	11.64	5.63^{**}	2.10^{*}

$^{**}p < .01$

$^{*}p < .05$

At the end of the second year, however, in analyzing the results of the original grouping, three classes had significantly lower social quotients in the Follow-up I (C-1, C-2, E-2) when compared with the post-test, as did the total group of children. It should be emphasized that this refers to an analysis of the social quotient, which is the ratio of social age to chronological age. When the social ages are examined, growth can be seen over the two-year period. The mean social age in the pre-test was 88.18, in the post-test 105.77, and in the Follow-up I the mean social age was 111.56. Thus, while the mean chronological age increased 12 months between the post-test and Follow-up I, the mean social age increased approximately 6 months.

An analysis of the combined control and combined experimental group is given in Table 135. Comparison of the post-test and Follow-up I shows that both the combined control and combined experimental groups had significantly lower social quotients at the end of the second year.

Means, standard deviations, and t-tests for the second year grouping are given in Table 136.

Summary

In evaluating the Vineland Social Maturity Scale, it should be emphasized that this is based on an interview between the parent(s) and an examiner. Parental biases and prejudices may thus play a role in the results.

The more rapid development reported during the project year may reflect the optimism freely expressed by many of the

TABLE 135

MEANS, STANDARD DEVIATIONS, t-TESTS, AND PROBABILITIES OF CHANCE DIFFERENCES IN MEANS FOR THE COMBINED CONTROL AND EXPERIMENTAL GROUPS ON THE VINELAND SCALE OF SOCIAL MATURITY, SOCIAL QUOTIENTS

Group	N	$\overline{X}$	σ	t
Combined Control Groups, Follow-up I	20	85.35	14.85	.48
Combined Experimental Groups, Follow-up I	19	87.53	11.42	
Comparison of Control Group, Pre-test, and Control Group, Follow-up I	20	96.95	12.44	.44
Comparison of Control Group, Post-test, and Control Group, Follow-up I	19	98.63	9.83	
Comparison of Experimental Group, Pre-test, and Experimental Group, Follow-up I	20	11.50	14.97	3.38**
Comparison of Experimental Group, Post-test, and Experimental Group, Follow-up I	19	11.11	8.48	5.55**

**p < .01

TABLE 136

MEANS, STANDARD DEVIATIONS, AND t-TESTS OF THE SIGNIFICANCE OF DIFFERENCES BETWEEN MEANS FOR THE GROUPING II VINELAND SCALE OF SOCIAL MATURITY SOCIAL QUOTIENTS

Group	N	Pre-test		Post-test		Follow-up I		Follow-up I and Post-test
		$\overline{X}$	σ	$\overline{X}$	σ	$\overline{X}$	σ	t
A	8	94.38	8.25	99.50	6.82	92.63	5.29	4.43**
B	10	82.80	9.16	91.80	11.25	82.60	13.09	3.58**
C	8	82.00	16.23	97.13	14.47	92.25	12.89	1.95
D	7	91.00	8.28	98.71	6.65	95.00	5.40	1.60

**p < .01

parents. Many of the children were experiencing success in school for the first time, after having spent an ego-shattering year in a regular class placement in which they could not perform adequately. This may have resulted in a more rapid development of social skills and abilities during the project year. During the second year this may have leveled off. Although the children continued to develop in terms of social age during the second year, this was at a slower rate than during the preceding year, which was reflected in the lower social quotients.

Another factor that may have played a role in a lower estimate of the children's social maturity at the end of the second year is the way in which the Vineland Scale is constructed. As the chronological age increases the child is expected to show growth in communication skills ("Does he write occasional short letters?" "Does he enjoy books, newspapers, magazines?") and in self direction generally ("Does he go about the neighborhood unattended?" "Does he engage in activities calling for simple creativity?"). The project children are academically retarded in the areas required for success in these communication skills.

Many of the parents also tended to be very solicitous and protective of the children. For example, many of the children were not trusted with even small amounts of money, were assigned no regular chores or responsibilities, and were in other ways protected from growth experiences.

Stanford Achievement Test

Tables 137 through 152 show the means, standard deviations, and tests of significance for the various subtests of

TABLE 137

MEANS, STANDARD DEVIATIONS, AND t-TESTS OF THE SIGNIFICANCE OF DIFFERENCES BETWEEN MEANS FOR THE STANFORD ACHIEVEMENT TEST, PARAGRAPH MEANING, FOR THE EXPERIMENTAL AND CONTROL GROUPS

Class	N	Pre-test		Post-test		Follow-up I		Follow-up I and	
		$\bar{X}$	σ	$\bar{X}$	σ	$\bar{X}$	σ	Post-test t	Pre-test t
C-1	9	.62	.75	1.32	1.05	2.23	1.23	4.38^{**}	6.52^{**}
C-2	9	.14	.43	1.28	1.06	2.30	.55	4.75^{**}	10.57^{**}
E-1	8	.54	.74	2.15	.41	3.11	.51	6.17^{**}	6.91^{**}
E-2	8	.56	1.04	.96	1.08	2.64	1.73	5.08^{**}	4.54^{**}
Total	34	.46	.75	1.42	1.00	2.55	1.12	9.20^{**}	12.60^{**}

$^{**}p < .01$

TABLE 138

MEANS, STANDARD DEVIATIONS, AND t-TESTS OF THE SIGNIFICANCE OF DIFFERENCES BETWEEN MEANS FOR THE STANFORD ACHIEVEMENT TEST, WORD MEANING, FOR THE EXPERIMENTAL AND CONTROL GROUPS

Class	N	Pre-test		Post-test		Follow-up I		Follow-up I and	
		$\bar{X}$	σ	$\bar{X}$	σ	$\bar{X}$	σ	Post-test t	Pre-test t
C-1	9	.00	.00	1.37	1.05	2.24	1.09	3.40^{**}	6.14^{**}
C-2	9	.24	.73	1.17	1.15	2.41	.50	3.91^{**}	11.97^{**}
E-1	8	.21	.60	2.49	.54	3.16	.86	2.81^{*}	10.77^{**}
E-2	8	.49	.90	1.12	1.25	2.51	1.46	5.21^{**}	5.33^{**}
Total	34	.23	.64	1.52	1.13	2.57	1.04	7.48^{**}	14.71^{**}

$^{**}p < .01$

$^{*}p < .05$

TABLE 139

MEANS, STANDARD DEVIATIONS, AND t-TESTS OF THE SIGNIFICANCE OF DIFFERENCES BETWEEN MEANS FOR THE STANFORD ACHIEVEMENT TEST, AVERAGE READING, FOR THE EXPERIMENTAL AND CONTROL GROUPS

Class	N	Pre-test		Post-test		Follow-up I		Follow-up I and	
		$\bar{X}$	σ	$\bar{X}$	σ	$\bar{X}$	σ	Post-test t	Pre-test t
C-1	9	.32	.39	1.38	1.24	2.28	1.18	4.48**	6.56**
C-2	9	.20	.60	1.23	1.09	2.38	.51	4.42**	14.52**
E-1	8	.34	.47	2.23	.48	3.34	1.72	5.97**	12.00**
E-2	8	.54	1.00	1.06	1.30	2.59	1.59	5.41**	4.96**
Total	34	.34	.63	1.48	1.07	2.63	1.08	9.70**	14.82**

**$p < .01$

TABLE 140

MEANS, STANDARD DEVIATIONS, AND t-TESTS OF THE SIGNIFICANCE OF DIFFERENCES BETWEEN MEANS FOR THE STANFORD ACHIEVEMENT TEST, SPELLING, FOR THE EXPERIMENTAL AND CONTROL GROUPS

Class	N	Pre-test		Post-test		Follow-up I		Follow-up I and	
		$\bar{X}$	σ	$\bar{X}$	σ	$\bar{X}$	σ	Post-test t	Pre-test t
C-1	9	.63	1.03	1.87	.94	2.17	1.57	1.08	4.43**
C-2	9	.32	.97	1.41	.93	2.27	1.49	3.79**	4.95**
E-1	8	.52	.76	2.85	.39	3.39	.97	1.91	5.24**
E-2	8	.50	.93	1.50	1.08	2.24	1.47	3.60**	3.71**
Total	34	.49	.89	1.89	1.01	2.50	1.43	4.85**	8.86**

**$p < .01$

TABLE 141

MEANS, STANDARD DEVIATIONS, AND t-TESTS OF THE SIGNIFICANCE OF DIFFERENCES BETWEEN MEANS FOR THE STANFORD ACHIEVEMENT TEST, ARITHMETIC REASONING, FOR THE EXPERIMENTAL AND CONTROL GROUPS

Class	N	Pre-test		Post-test		Follow-up I		Follow-up I and	
		$\overline{X}$	σ	$\overline{X}$	σ	$\overline{X}$	σ	Post-test t	Pre-test t
C-1	9	.00	.00	1.86	.87	2.57	1.47	2.81^{*}	5.23^{**}
C-2	9	.00	.00	1.83	.78	2.58	.86	3.51^{**}	8.95^{**}
E-1	8	.00	.00	2.42	.84	3.04	.77	5.03^{**}	11.21^{**}
E-2	8	.62	1.22	2.01	.90	2.98	1.50	2.96^{*}	6.23^{**}
Total	34	.15	.62	2.02	.84	2.78	1.17	6.51^{**}	14.37^{**}

$^{**}p < .01$

$^{*}p < .05$

TABLE 142

MEANS, STANDARD DEVIATIONS, AND t-TESTS OF THE SIGNIFICANCE OF DIFFERENCES BETWEEN MEANS FOR THE STANFORD ACHIEVEMENT TEST, ARITHMETIC COMPUTATION, FOR THE EXPERIMENTAL AND CONTROL GROUPS

Class	N	Pre-test		Post-test		Follow-up I		Follow-up I and	
		$\overline{X}$	σ	$\overline{X}$	σ	$\overline{X}$	σ	Post-test t	Pre-test t
C-1	9	.67	1.04	1.90	1.14	2.32	1.23	3.61^{**}	4.11^{**}
C-2	9	.27	.80	1.83	.43	2.39	.64	3.29^{****}	14.24^{**}
E-1	8	.41	.77	2.32	.69	2.71	.51	3.40^{****}	7.62^{**}
E-2	8	.65	1.20	2.14	1.13	2.32	1.29	.65	4.43^{**}
Total	34	.50	.94	2.04	.88	2.43	.95	4.43^{**}	12.02^{**}

$^{**}p < .01$

$^{****}p < .02$

TABLE 143

MEANS, STANDARD DEVIATIONS, AND t-TESTS OF THE SIGNIFICANCE OF DIFFERENCES BETWEEN MEANS FOR THE STANFORD ACHIEVEMENT TEST, AVERAGE ARITHMETIC, FOR THE EXPERIMENTAL AND CONTROL GROUPS

Class	N	Pre-test		Post-test		Follow-up I		Follow-up I and	
		X̄	σ	X̄	σ	X̄	σ	Post-test t	Pre-test t
C-1	9	.24	.49	1.86	.98	2.47	1.36	3.62**	5.60**
C-2	9	.13	.40	1.97	.71	2.57	.72	4.65**	11.48**
E-1	8	.00	.00	2.36	.74	2.89	.58	4.74**	13.13**
E-2	8	.64	1.19	2.00	1.11	2.68	1.35	3.36****	5.89**
Total	34	.25	.68	2.04	.87	2.64	1.04	8.04**	15.33**

**p < .01
****p < .02

TABLE 144

MEANS, STANDARD DEVIATIONS, AND t-TESTS OF THE SIGNIFICANCE OF DIFFERENCES BETWEEN MEANS FOR THE STANFORD ACHIEVEMENT TEST, BATTERY MEAN, FOR THE EXPERIMENTAL AND CONTROL GROUPS

Class	N	Pre-test		Post-test		Follow-up I		Follow-up I and	
		X̄	σ	X̄	σ	X̄	σ	Post-test t	Pre-test t
C-1	9	.39	.52	1.66	.86	2.30	1.22	4.70**	6.33**
C-2	9	.19	.57	1.56	.82	2.40	.71	7.09**	11.89**
E-1	8	.36	.57	2.44	.37	3.08	.64	5.40**	8.35**
E-2	8	.58	1.07	1.55	.98	2.54	1.32	5.37**	6.21**
Total	34	.37	.69	1.79	.84	2.56	1.01	9.44**	15.01**

**p < .01

the Stanford Achievement Test when arranged according to the original grouping of control and experimental groups. Only t-tests of the significance of differences between means for the post-test and Follow-up I, and between pre-test and Follow-up I, are presented in these tables. The reader interested in a comparison of the pre-test and post-test is referred to the preceding section.

All of the t-tests presented comparing the total group of children on the basis of either post-test and Follow-up I, or pre-test and Follow-up I, are significant at the .05 level or beyond, showing substantial growth in the academic skills measured by the achievement test. Two classes (Table 140, C-1 and E-1) did not show a significant difference between means for the spelling subtest, in comparing post-test and Follow-up I, and one class (Table 142, E-2) did not show a difference in means for the arithmetic computation subtest for the same comparison. In each case the failure to show increased growth can probably be explained in the teaching emphasis of the teacher. One teacher, for example, stressed word recognition and comprehension more than spelling, while the other emphasized arithmetic reasoning and process more than the mechanics of computation.

When the combined control and combined experimental groups are examined, statistically significant progress was made by both groups on all subtests except one: the combined experimental group did not show a significant difference between the post-test and Follow-up I on the arithmetic computation

TABLE 145

MEANS, STANDARD DEVIATIONS, *t*-TESTS, AND PROBABILITIES OF CHANCE DIFFERENCES IN MEANS FOR THE CONTROL AND EXPERIMENTAL GROUPS ON THE ACHIEVEMENT TEST: *PARAGRAPH MEANING*

Group	N	$\bar{X}$	σ	*t*
Combined Control Groups, Follow-up I	18	2.27	.90	1.56
Combined Experimental Groups, Follow-up I	16	2.88	.39	
Comparison of Control Group Pre-test, and Control Group, Follow-up I	18	1.83	.68	11.49^{**}
Comparison of Control Group Post-test, and Control Group, Follow-up I	18	.97	.61	6.62^{**}
Comparison of Experimental Group, Pre-test, and Experimental Group, Follow-up I	16	2.32	.11	7.96^{**}
Comparison of Experimental Group, Post-test, and Experimental Group, Follow-up I	16	1.32	.77	6.63^{**}

$^{**}p < .01$

section. When the individual scores are examined, it can be seen that all of the children in Group E-1 made small gains over the course of this second academic year, while in the E-2 group three children made scores lower at the end of the year than they did at the beginning. These three children had been in this same class the preceding year, and had made substantial gains then.

TABLE 146

MEANS, STANDARD DEVIATIONS, t-TESTS, AND PROBABILITIES OF CHANCE DIFFERENCES IN MEANS FOR THE CONTROL AND EXPERIMENTAL GROUPS ON THE ACHIEVEMENT TEST: WORD MEANING

Group	N	$\bar{X}$	σ	t
Combined Control Groups, Follow-up I	18	2.33	.85	1.39
Combined Experimental Groups, Follow-up I	16	2.84	1.17	
Comparison of Control Group, Pre-test, and Control Group, Follow-up I	18	2.21	.80	11.14**
Comparison of Control Group, Post-test, and Control Group, Follow-up I	18	1.06	.84	5.23**
Comparison of Experimental Group, Pre-test, and Experimental Group, Follow-up I	16	2.49	.99	9.76**
Comparison of Experimental Group, Post-test, and Experimental Group, Follow-up I	16	1.03	.76	5.27**

**$p < .01$

These results are difficult to interpret. It may have been that the change in group composition had some effect, or some unreported and unobserved change in teacher approach during the second year may be a factor.

TABLE 147

MEANS, STANDARD DEVIATIONS, t-TESTS, AND PROBABILITIES OF CHANCE DIFFERENCES IN MEANS FOR THE CONTROL AND EXPERIMENTAL GROUPS ON THE ACHIEVEMENT TEST: AVERAGE READING

Group	N	$\bar{X}$	σ	t
Combined Control Groups, Follow-up II	18	2.33	.86	1.69
Combined Experimental Groups, Follow-up II	16	2.96	1.17	
Comparison of Control Group, Pre-test, and Control Group, Follow-up II	18	.21	.68	12.60^{**}
Comparison of Control Group, Post-test and Control Group, Follow-up II	18	1.02	.67	6.31^{**}
Comparison of Experimental Group, Pre-test, and Experimental Group, Follow-up II	16	2.52	1.00	9.56^{**}
Comparison of Experimental Group, Follow-up I, and Experimental Group, Follow-up II	16	1.28	.67	7.45^{**}

$^{**}p < .01$

TABLE 148

MEANS, STANDARD DEVIATIONS, t-TESTS, AND PROBABILITIES OF CHANCE DIFFERENCES IN MEANS FOR THE CONTROL AND EXPERIMENTAL GROUPS ON THE ACHIEVEMENT TEST: SPELLING

Group	N	$\overline{X}$	σ	t
Combined Control Groups, Follow-up I	18	2.22	1.44	1.17
Combined Experimental Groups, Follow-up I	16	2.81	1.30	
Comparison of Control Group, Pre-test, and Control Group, Follow-up I	18	1.74	.11	6.71^{**}
Comparison of Control Group, Post-test, and Control Group, Follow-up I	18	.56	.76	3.12^{**}
Comparison of Experimental Group, Pre-test, and Experimental Group, Follow-up I	16	2.30	.15	6.10^{**}
Comparison of Experimental Group, Post-test, and Experimental Group, Follow-up I	16	.64	.66	3.75^{**}

$^{**}p < .01$

TABLE 149

MEANS, STANDARD DEVIATIONS, *t*-TESTS, AND PROBABILITIES OF CHANCE DIFFERENCES IN MEANS FOR THE CONTROL AND EXPERIMENTAL GROUPS ON THE ACHIEVEMENT TEST: ARITHMETIC REASONING

Group	N	$\bar{X}$	σ	*t*
Combined Control Groups, Follow-up I	18	2.57	1.14	1.04
Combined Experimental Groups, Follow-up I	16	3.01	1.12	
Comparison of Control Group, Pre-test,and Control Group, Follow-up I	18	2.57	1.14	9.32^{**}
Comparison of Control Group, Post-test, and Control Group, Follow-up I	18	.73	.66	4.55^{**}
Comparison of Experimental Group, Pre-test, and Experimental Group, Follow-up I	16	2.69	.94	11.18^{**}
Comparison of Experimental Group, Post-test, and Experimental Group, Follow-up I	16	.79	.67	4.52^{**}

$^{**}p < .01$

TABLE 150

MEANS, STANDARD DEVIATIONS, t-TESTS, AND PROBABILITIES OF CHANCE DIFFERENCES IN MEANS FOR THE CONTROL AND EXPERIMENTAL GROUPS ON THE ACHIEVEMENT TEST: ARITHMETIC COMPUTATION

Group	N	$\bar{X}$	σ	t
Combined Control Groups, Follow-up I	18	2.36	.93	.47
Combined Experimental Groups, Follow-up I	16	2.52	.94	
Comparison of Control Group, Pre-test, and Control Group, Follow-up I	18	1.89	.89	8.75**
Comparison of Control Group, Post-test, and Control Group, Follow-up I	18	.49	.42	4.84**
Comparison of Experimental Group, Pre-test, and Experimental Group, Follow-up I	16	.20	.96	8.05**
Comparison of Experimental Group, Post-test, and Experimental Group, Follow-up I	16	.29	.59	1.90

**$p < .01$

TABLE 151

MEANS, STANDARD DEVIATIONS, *t*-TESTS, AND PROBABILITIES OF CHANCE DIFFERENCES IN MEANS FOR THE CONTROL AND EXPERIMENTAL GROUPS ON THE ACHIEVEMENT TEST: AVERAGE ARITHMETIC

Group	N	$\bar{X}$	σ	*t*
Combined Control Groups, Follow-up I	18	2.52	1.03	.71
Combined Experimental Groups, Follow-up I	16	2.78	.99	
Comparison of Control Group, Pre-test, and Control Group, Follow-up I	18	2.33	.97	10.58**
Comparison of Control Group, Post-test, and Control Group, Follow-up I	18	.58	.43	5.88**
Comparison of Experimental Group, Pre-test, and Experimental Group, Follow-up I	16	2.46	.88	10.89**
Comparison of Experimental Group, Post-test, and Experimental Group, Follow-up I	16	.59	.43	5.36**

$^{**}p < .01$

TABLE 152

MEANS, STANDARD DEVIATIONS, t-TESTS, AND PROBABILITIES OF CHANCE DIFFERENCES IN MEANS FOR THE CONTROL AND EXPERIMENTAL GROUPS ON THE ACHIEVEMENT TEST: BATTERY MEAN

Group	N	$\overline{X}$	σ	t
Combined Control Groups, Follow-up I	18	2.35	.94	1.27
Combined Experimental Groups, Follow-up I	16	2.81	1.01	
Comparison of Control Group, Pre-test, and Control Group, Follow-up I	18	2.06	.73	11.71**
Comparison of Control Group, Post-test, and Control Group, Follow-up I	16	.74	.38	2.57****
Comparison of Experimental Group, Pre-test and Experimental Group, Follow-up I	16	.23	.93	6.77**
Comparison of Experimental Group, Post-test and Experimental Group, Follow-up I	16	.81	.44	7.06**

**$p < .01$

****$p < .02$

At the end of the first year (academic year 1957-1958), the children were re-assigned to classes. Each class had a core of 4 or 5 children remaining from the previous year, the other 5 children being new to that particular class. Tables 153 through 160 show the statistics for the second year grouping, which, for convenience, have been labeled "Grouping II."

TABLE 153

MEAN GRADE LEVELS, STANDARD DEVIATIONS, AND t-TESTS OF THE SIGNIFICANCE OF DIFFERENCES BETWEEN MEANS FOR THE GROUPING II STANFORD ACHIEVEMENT TEST DATA: PARAGRAPH MEANING

Group	N	Pre-test		Post-test		Follow-up I		Follow-up I and Post-test
		$\bar{X}$	σ	$\bar{X}$	σ	$\bar{X}$	σ	t
A	8	1.29	.82	2.24	.36	3.54	.94	4.03**
B	10	.00	.00	.72	.72	2.02	1.07	5.70**
C	9	.30	.57	1.49	.95	2.51	.49	5.03**
D	7	.39	.62	1.40	.89	2.24	1.16	3.59**

**$p < .01$

The statistics have been presented for each class as though it had been similarly constituted in the pre-test and post-test period, and have been included for comparative purposes.

As can be seen from these tables, all classes made significant academic gains by the end of the second year as

TABLE 154

MEAN GRADE LEVELS, STANDARD DEVIATIONS, AND t-TESTS OF THE SIGNIFICANCE OF DIFFERENCES BETWEEN MEANS FOR THE GROUPING II STANFORD ACHIEVEMENT TEST DATA: WORD MEANING

Group	N	Pre-test		Post-test		Follow-up I		Follow-up I and Post-test
		$\overline{X}$	σ	$\overline{X}$	σ	$\overline{X}$	σ	t
A	8	.98	.98	2.39	.36	3.43	.88	4.36**
B	10	.00	.00	.84	1.06	2.04	.94	4.60**
C	9	.00	.00	1.48	1.17	2.63	.55	3.43**
D	7	.00	.00	1.56	1.01	2.26	1.11	2.54*

$^{**}p < .01$

$^{*}p < .05$

TABLE 155

MEAN GRADE LEVELS, STANDARD DEVIATIONS, AND t-TESTS OF THE SIGNIFICANCE OF DIFFERENCES BETWEEN MEANS FOR THE GROUPING II STANFORD ACHIEVEMENT TEST DATA: AVERAGE READING

Group	N	Pre-test		Post-test		Follow-up I		Follow-up I and Post-test
		$\overline{X}$	σ	$\overline{X}$	σ	$\overline{X}$	σ	t
A	8	1.11	.81	2.34	.35	3.50	.86	4.40**
B	10	.00	.00	.78	.98	2.05	1.01	5.47**
C	9	.16	.29	1.48	1.03	2.59	1.59	4.47**
D	7	.20	.32	1.47	.94	2.27	1.12	3.28****

$^{**}p < .01$
$^{****}p < .02$

TABLE 156

MEAN GRADE LEVELS, STANDARD DEVIATIONS, AND t-TESTS OF THE SIGNIFICANCE OF DIFFERENCES BETWEEN MEANS FOR THE GROUPING II STANFORD ACHIEVEMENT TEST DATA: SPELLING

Group	N	Pre-test		Post-test		Follow-up I		Follow-up I and Post-test t
		$\bar{X}$	σ	$\bar{X}$	σ	$\bar{X}$	σ	
A	8	1.56	1.05	2.68	.35	3.53	.73	3.17****
B	10	.00	.00	1.42	.95	1.87	1.46	1.71
C	9	.13	.38	1.78	.77	2.44	1.05	.70
D	7	.44	.71	1.81	1.26	2.29	1.67	1.60

$^{****}p < .02$

TABLE 157

MEAN GRADE LEVELS, STANDARD DEVIATIONS, AND t-TESTS OF THE SIGNIFICANCE OF DIFFERENCES BETWEEN MEANS FOR THE GROUPING II STANFORD ACHIEVEMENT TEST DATA: ARITHMETIC REASONING

Group	N	Pre-test		Post-test		Follow-up I		Follow-up I and Post-test t
		$\bar{X}$	σ	$\bar{X}$	σ	$\bar{X}$	σ	
A	8	.63	1.14	2.76	.53	3.51	.88	3.52**
B	10	.00	.00	1.70	.83	2.31	1.24	2.27*
C	9	.00	.00	2.01	.85	2.93	1.09	5.66**
D	7	.00	.00	1.64	.32	2.40	.83	2.90****

$^{**}p < .01$

$^{****}p < .02$

$^{*}p < .05$

TABLE 158

MEAN GRADE LEVELS, STANDARD DEVIATIONS, AND t-TESTS OF THE SIGNIFICANCE OF DIFFERENCES BETWEEN MEANS FOR THE GROUPING II STANFORD ACHIEVEMENT TEST DATA: ARITHMETIC COMPUTATION

Group	N	Pre-test		Post-test		Follow-up I		Follow-up I and Post-test
		$\overline{X}$	σ	$\overline{X}$	σ	$\overline{X}$	σ	t
A	8	1.35	1.11	2.58	.50	3.06	.68	2.87*
B	10	.00	.00	1.84	.97	1.94	1.18	.49
C	9	.23	.66	2.27	.83	2.57	.78	3.53**
D	7	.57	.94	1.64	.82	2.43	.59	5.07**

**$p < .01$

*$p < .05$

TABLE 159

MEAN GRADE LEVELS, STANDARD DEVIATIONS, AND t-TESTS OF THE SIGNIFICANCE OF DIFFERENCES BETWEEN MEANS FOR THE GROUPING II STANFORD ACHIEVEMENT TEST DATA: AVERAGE ARITHMETIC

Group	N	Pre-test		Post-test		Follow-up I		Follow-up I and Post-test
		$\overline{X}$	σ	$\overline{X}$	σ	$\overline{X}$	σ	t
A	8	.79	1.10	2.74	.49	3.30	.71	4.32**
B	10	.00	.00	1.76	.84	2.14	1.18	2.14
C	9	.11	.31	2.13	.81	2.78	.92	5.86**
D	7	.17	.32	1.51	.73	2.43	.71	8.46**

**$p < .01$

TABLE 160

MEAN GRADE LEVELS, STANDARD DEVIATIONS, AND *t*-TESTS OF THE SIGNIFICANCE OF DIFFERENCES BETWEEN MEANS FOR THE GROUPING II STANFORD ACHIEVEMENT TEST DATA: BATTERY MEAN

Group	N	Pre-test		Post-test		Follow-up I		Follow-up I and Post-test
		$\bar{X}$	σ	$\bar{X}$	σ	$\bar{X}$	σ	*t*
A	8	1.44	.78	2.54	.28	3.40	.65	5.46^{**}
B	10	.00	.00	1.29	.81	2.03	1.03	4.84^{**}
C	9	.13	.99	1.81	.74	2.60	.65	6.92^{**}
D	7	.29	.46	1.61	.82	2.33	1.01	4.35^{**}

$^{**}p < .01$

compared to the post-test results on all subtests except three: spelling, arithmetic computation, and average arithmetic. These results probably reflect differences in teaching emphasis.

Intelligence Grade Placement

The question arises as to the grade level one might legitimately expect the project children to perform at on the basis of their intelligence test scores. An attempt has been made to answer this question by data supplied in the manual which accompanies the California Short-form Test of Mental Maturity. This is called an Intelligence (MA) Grade Placement Scale, which is a type of mental age scale, expressed in grade placement units. For example, an Intelligence Grade Placement of 2.5 indicates the median mental age of those cases in the standardization group whose actual grade placement is 2.5.

Reported correlations between the California Test of Mental Maturity and the Stanford-Binet have been uniformly high (from .70 to .88+). While recognizing that there is a certain amount of risk in using the Stanford-Binet Mental Ages in arriving at the intelligence grade placement which is based on mental ages obtained from a different intelligence test, it was nevertheless felt justifiable in order to provide a basis for comparison. Tables 161 through 163 present the Intelligence Grade Placement of the control and experimental groups to provide a basis for comparison in considering the academic growth of the children.

TABLE 161

INTELLIGENCE GRADE PLACEMENT DURING THE PRE-TEST PERIOD (OCTOBER, 1957)

Group	N	$\overline{X}$	σ
C-1	10	1.41	.91
C-2	10	1.37	1.12
E-1	10	1.26	.72
Total	39	1.41	1.03

Tables 137 through 144 show the Stanford Achievement Test data for the three tests. As may be noted, there was an attrition in the sample such that the total was reduced from 39 to 34. The pre-test and post-test data as reported here are based on the 34 remaining subjects. It must be remembered that the children had been assigned to other groups at the end of

TABLE 162

INTELLIGENCE GRADE PLACEMENT DURING THE POST-TEST PERIOD (JUNE, 1958)

Group	N	$\bar{X}$	σ
C-1	10	1.96	.89
C-2	10	2.13	.76
E-1	10	1.82	.97
E-2	9	2.49	1.62
Total	39	2.10	1.12

TABLE 163

INTELLIGENCE GRADE PLACEMENT DURING THE FOLLOW-UP II PERIOD (JUNE, 1959)

Group	N	$\bar{X}$	σ
C-1	10	2.81	1.31
C-2	10	2.90	1.38
E-1	10	2.72	1.06
E-2	9	3.19	2.15
Total	39	2.90	1.53

the project year. The Follow-up I data are reported as if the children had been assigned to the same experimental and control groups as at the beginning of the project year. It was felt desirable to do this in order to see if the original experimental and control conditions had a lasting effect on academic performance.

The second year grouping will be shown in subsequent tables under the heading of Grouping II.

As can be seen in the achievement test means reported in Tables 137 through 144, in the pre-test period none of the control and experimental groups performed at a level commensurate with the Intelligence Grade Placement. In considering the total group of 39 children, one child (C-2-10) had an Achievement Test Battery mean higher than his Intelligence Grade Placement score (I.G.P. = .3; Battery Mean = 1.7).

In the post-test (June, 1958), all achievement test group means were lower than the mean intelligence grade placement with the exception of Experimental Group I. In this one group the achievement scores were higher than the intelligence grade placements. Nine out of the 10 children had achievement scores higher than would have been predicted on the basis of their mental ages alone. In considering the total group of 39 children, 14 had achievement test battery means higher than their intelligence grade placement, in contrast to the one child noted in the preceding paragraph who scored thus at the beginning of the project.

In the Follow-up I (June, 1959) one experimental group (E-1) maintained the superiority noted in the preceding paragraph. All groups except E-1 had group achievement score means lower than the corresponding mean intelligence grade placement. E-1 had higher achievement test means on every subtest with the exception of Arithmetic Computation (Intelligence Grade Placement = 2.72; Arithmetic Computation = 2.71). Even on this one subtest the difference is so slight that we can say that the group was performing at expectancy.

In considering the total group of children in the pretest period (1957), the mean Intelligence Grade Placement was 1.41, and the Battery Mean was .37, which indicates an over-all academic retardation of 1.04 grade level. By the end of the project (June, 1958), however, the Intelligence Grade Placement was 2.10, and the Battery Mean was 1.74, which indicates an academic retardation of only .36 grade level. One year later, in June, 1959, the Intelligence Grade Placement was 2.90, and the Battery Mean was 2.56, showing academic retardation of .34. Thus, in the period from September, 1957, to June, 1959, the mean Battery Mean for the entire group had increased by 2.19 grade levels, and the total academic retardation had been reduced from 1.04 to .34.

In summarizing the Intelligence Grade Placement data, it can be said that at the beginning of the project all four groups of children were performing academically below the level one would predict on the basis of their mental ages alone. By the end of the project year, however, one group (Experimental Group I) was performing at a mean grade level higher than the mean Intelligence Grade Placement, and in the second year, even when these children were assigned to other groups, this higher level of academic performance was maintained. The mean increase in Battery Mean for this same period of time was 2.19 grade levels, and the academic retardation had been reduced from 1.04 to .34 grade level.

Intelligence and Achievement

Inasmuch as most current intelligence tests have been validated against academic achievement, it comes as no surprise that there is a high correlation between both IQ and academic achievement, and MA and academic achievement, as may be seen in Tables 164 and 165. One very interesting thing about these tables, however, is the clear evidence that the correlation between intelligence and achievement became greater over the two-year period of this study. This may be interpreted to mean that the children with higher initial intellectual ability profited more from their school experiences, and that this became a more important factor as time passed. It may be presumed that this trend would continue until all of the children reached an academic level completely in agreement with their intellectual potential.

TABLE 164

PEARSON PRODUCT MOMENT CORRELATION COEFFICIENTS BETWEEN STANFORD-BINET INTELLIGENCE QUOTIENTS AND THE STANFORD ACHIEVEMENT TEST[a]

Subtest	Pre-test (N = 38)	Post-test (N = 38)	Follow-up I (N = 34)
Average Reading	.54	.46	.60
Average Arithmetic	.50	.63	.76
Battery Mean	.55	.57	.65

[a] All *r*'s reported in the above table are significant at less than the .01 level.

TABLE 165

PEARSON PRODUCT MOMENT CORRELATION COEFFICIENTS BETWEEN STANFORD-BINET MENTAL AGES AND THE STANFORD ACHIEVEMENT TEST[a]

Subtest	Pre-test (N = 38)	Post-test (N = 38)	Follow-up I (N = 34)
Average Reading	.54	.49	.61
Average Arithmetic	.51	.69	.76
Battery Mean	.54	.66	.69

[a] All r's reported in the above table are significant at less than the .01 level.

Another inference from these two tables is that mental age and intelligence quotient are quite comparable in predicting academic achievement. This comparability is greatly enhanced, of course, by the relatively narrow range of chronological ages of the children chosen for the study.

Summary

The area of most dramatic improvement over the two-year period is in academic achievement. At the beginning of the project only 12 children were able to score on part or all of the achievement test. This did not represent a true level of academic functioning, however, as many personal and environmental variables were operating to result in lowered test performance. The children's hyperactivity, perseveration, distractibility, difficulty with figure-background relationships, and inability to follow directions made it impossible for them to respond adequately in a standardized testing situation. By the end of the second year, however, the children had sufficiently overcome the problems mentioned above so that all were able to perform on at least part of the test.

One clear-cut inference that can be made from these results is that there were no demonstrable differences in academic achievement between the combined experimental and combined control groups. With few exceptions, however, the total group of children made substantial gains over this period.

Achievement Test Scores and EEG Patterns

Four of the 39 children were not considered in the following EEG analysis because their EEG reports were either not available at the time of writing, or else had been given and interpreted by someone other than the neurological consultant. Of the remaining 35, 14 had normal and 21 abnormal EEG patterns. Tables 166, 167, and 168 show a comparison of the mean Stanford Achievement Test scores for the children having normal and abnormal EEG's, for the pre-test, post-test, and Follow-up I. As can be seen from these tables, the abnormal EEG group did not have significantly lower achievement test scores than did the normal EEG group. It should be noted, however, that every mean achievement test score for the children having normal EEG's was higher than the corresponding mean achievement test score of children with abnormal EEG's, although this did not reach the level of confidence accepted in the present study. This difference is readily understandable when one considers that the mean IQ of the children having normal EEG's was 87.36, standard

TABLE 166

A COMPARISON OF THE PRE-TEST (OCTOBER, 1957) STANFORD ACHIEVEMENT TEST SCORES OF CHILDREN HAVING NORMAL AND ABNORMAL ELECTROENCEPHALOGRAMS

Subtest	Electroencephalograms				t
	Normal (N = 14)		Abnormal (N = 21)		
	$\bar{X}$	σ	$\bar{X}$	σ	
Average Reading	.67	.89	.20	.45	1.91
Average Arithmetic	.51	.91	.18	.39	1.34
Battery Mean	.67	.92	.21	.46	1.83

TABLE 167

A COMPARISON OF THE POST-TEST (JUNE, 1958) STANFORD ACHIEVEMENT TEST SCORES OF CHILDREN HAVING NORMAL AND ABNORMAL ELECTROENCEPHALOGRAMS

Subtest	Electroencephalograms				t
	Normal (N = 14)		Abnormal (N = 21)		
	$\bar{X}$	σ	$\bar{X}$	σ	
Average Reading	1.90	1.37	1.25	.98	1.50
Average Arithmetic	2.41	.86	1.81	.78	2.00
Battery Mean	2.16	1.02	1.54	.79	1.89

deviation 14.47, and for the children having normal EEG's the mean IQ was 75.95, standard deviation 9.48. The difference in intelligence level could account for the trend which has been mentioned.

TABLE 168

A COMPARISON OF THE FOLLOW-UP I (JUNE, 1959) STANFORD ACHIEVEMENT TEST SCORES OF CHILDREN HAVING NORMAL AND ABNORMAL ELECTROENCEPHALOGRAMS

Subtest	Electroencephalograms				t
	Normal (N = 13)		Abnormal (N = 19)		
	$\bar{X}$	σ	$\bar{X}$	σ	
Average Reading	2.94	1.12	2.30	.94	1.77
Average Arithmetic	2.85	1.16	2.45	.91	1.10
Battery Mean	2.79	1.08	2.36	.92	1.22

Discussion

As pointed out by Masland, Sarason, and Gladwin (45), psychometric patterning suggestive of brain injury can neither be confirmed nor denied in the absence of positive neurological data. The inability of the medical diagnostic staff to arrive at a unanimous diagnostic impression in regard to brain injury made it impossible to conduct an analysis of the children's test data along these dimensions. The EEG results are being reported with the full realization that any one single diagnostic procedure is at best highly unreliable. Within the limits of the present pilot study, however, it may be concluded that the EEG did not discriminate between those children who achieved academically, and those who did not, when the gross classification of records into a dichotomy of "normal" and "abnormal" patterns was made.

Summary and Discussion of Psychological Data

It should be emphasized that this was a demonstration pilot study, without rigidly controlled conditions that would enable definite statements about very specific and carefully defined variables. This was a demonstration project showing how interdisciplinary diagnostic findings shaped a certain type of educational philosophy and teaching methodology and how such a program operated within the existing public school system. It is a descriptive study of an educational approach to the learning and behavior problems of the hyperactive child.

When one attempts to work within an already organized and structured situation, certain procedures may have to be changed to meet the existing framework. In large measure this is what happened in the current project. Scientific research methodology was modified to meet the exigencies of the public school system.

An attitude shared by many school administrators must be recognized from the outset. This is the feeling that if one has information that might be of value in working with a child, there is a moral responsibility to see that this information is used. In other words, collecting diagnostic information about a group of children, and then assigning part of them to one type of treatment which may meet their needs ("experimental") and the remainder to another type of treatment which may not meet their needs ("control") is morally repugnant to many school administrators. Thus, the design carefully worked out from a methodological point of view may be subjected to rude violation when thrust into the practical school setting. The end result, of course, is that when a program has to be modified to the extent that the present program was changed, then explanation of the results becomes impossible. One can only describe what happened.

In the foregoing section an attempt has been made to present descriptive statstics to show what happened to the project children as shown on the psychological and educational tests. The children grew in very important ways, both educationally and psychologically. The extreme learning problems of many of the children at the beginning of the project were greatly modified by the end of the second year. When the data are examined, however, it is not possible to say with certainty that the specialized methodology caused the growth. Other factors were operative congruently with the operation of the project that must have had far-reaching effects on the children's development, but which are impossible to evaluate. Such factors would include maturation, later participation of a number of the children in physical education classes at the University of Maryland, the participation of a number of children in psychotherapy,special swimming instruction during the summer, private tutoring by either an interested parent or even on a professional basis, experiences of some of the children in Boy Scout groups, speech therapy, etc. The children in this project are very fortunate to be living within the metropolitan District of Columbia area where many educational and growth experiences are available which would not be available to children living in other parts of the country. Many of the children came from homes in which the parents were professional people, and where the educational and social climate of the home was considerably above the average for the nation.

With the foregoing reservations in mind, the two following generalizations can be made on the basis of the psychological and achievement test results:

1. At the end of the project year, the experimental classes had made temporary gains in comparison to the control group on several of the scoring categories of the perceptual tests (Bender-Gestalt, Syracuse Visual Figure Background Test), and the Vineland Scale of Social Maturity. By the end of the second year (Follow-up I), after the classes had been regrouped and the teaching approach varied, the children originally in the experimental classes had lost these gains. The experimental conditions (reduction in stimulation by physical alteration of the rooms, and relatively increased structure and control in the teaching methodology) did not have a permanent measurable effect.

2. The total group of 39 children, disregarding their placement in experimental or control classes, made significant academic improvement, and showed considerably fewer errors on the perceptual and visuomotor tests (Bender-Gestalt, Syracuse Visual Figure Background Test).

The psychological test battery originally chosen on the basis of the usefulness of the individual tests in assessing brain injury did in fact show patterns suggestive of brain injury in the records of 33 of the children. As the medical staff was unable to arrive at criteria for diagnosing brain injury, however, an analysis of the psychological test performance along these dimensions was not possible.

Psychiatric Evaluations[1]

Psychiatric evaluations were made individually with all of the children in the pilot study groups during and as a part of the diagnostic examination period. The same psychiatrist was retained during the demonstration period to observe the children and to cooperate in interpreting their behavior to the teaching staff. At the close of the demonstration year, psychiatric re-evaluations were made for each child by the same psychiatrist.

Table 169 summarizes the psychiatric observations made during the pre- and post-test periods. No attempt has been made to quantify these data, since each comment consists of a subjective clinical impression. A careful reading of the data, however, is rewarding in providing the reader with a unique understanding of the psychiatric nature of the subjects, how they appeared at the beginning of the educational experience, their status at the close of the ten-month educational period, and the behavioral changes which a number of the subjects achieved.

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[1] The authors are indebted to Dr. Christine Kehne, M.D., psychiatric member of the Diagnostic Team, who completed all of the initial and follow-up psychiatric evaluations and who prepared the material which appears in the following pages of this chapter.

TABLE 169

PSYCHIATRIC OBSERVATIONS OF SUBJECTS: PRE- AND POST-TEST DATA

Variable		Subject		
		E-1-1	E-1-8	E-2-7
Intelligence Clinical Impression		borderline capacity	somewhat diminished normal capacity	retarded
Appearance	Pre	friendly cooperative tall and thin somewhat carelessly dressed, excessive drooling	neat, good looking young for age	neat well-developed bubbly saliva attractive
	Post	Ivy league clothes serious minded almost absent drooling	no difference	no difference
Attitudes	Pre	trying to please fears his destructive power, asks to have hands washed	friendly enthusiastic, cooperative polite	stubborn, expects to be dressed, overestimates ability to complete puzzles desires to learn
	Post	likes school now on his own achieving	friendly, not always cooperative or polite	tense, still overconfident
Behavioral Observations Characteristics	Pre	showed no frustration over repeated attempts to put 2 parts of a tank together, perseverative thinking, irrelevant answers distractible	much singing to cover anxiety, no hyperactivity but considerable energy expended	friendly, affectionate, easily distractible except from painting responded to firmness by cooperating finally tied own shoe when not helped
	Post	not distractible	able to disagree, refused to draw picture, very reluctant to stop	
Play Activities	Pre	accurate, intense hitting of Bobo [illegible] cowboy Indian fighting, offered story for every activity, played Old Maid with enjoyment	cowboys beat Indians wounded in gun play dollhouse, played toilet	perseverated on finger painting identified many objects, hesitated to use gun on Bobo freely
	Post	more cowboys and Indians, toy train talking a lot	guns broken, hence more hitting of Bobo burned a house, leaving people within and removing only furniture	repeated same activities but less con- concerned to take painting home
Motor Patterns Coordination	Pre	normal gross marked difficulty with name on line	gross hints average	jumbly normal gross
	Post	no change		

TABLE 169--Continued

Variable		Subject		
		E-1-1	E-1-8	E-2-7
Draw a Person	Pre		house with chimney at right angle	immature stick figure quite good name writing
	Post			
Orientation Memory Time Space	Pre			marked difficulty with Johns of puzzle receptive aphasia
	Post		good memory for last interview	absent receptive aphasia
Despert Fables Phantasies and Dreams and Wishes	Pre		bike, large 2 guns	none given
	Post	dreamed mother lion in bed with him		
Speech and Language	Pre	on and off stumbling over phrases, saliva obscured words, rapid	sing-song high pitched stammering organic unclear	prefers sign language, indistinct words if pressed to talk
	Post	defect less noticeable	much clearer little stammering	relatively more verbal
Parent Conference	Post	Mother attended: alert, interested, notices that he must always play the "bad guy" encouraged to revive use of Bobo by the children over protective	both parents present anxious to report the child's progress	Mother attended: she is interested and objective, tho matter of fact: has compromised with Father who is spontaneous, week days better for child inconsistency a family pattern, wonder if she understands them
Parent Evaluation of Child	Post	much more relaxed, more a family member parents less protective feels he is still the "fall guy" to his peers	calmer, more self confident "independent type, eating and sleeping better" speech clearer	easier speech, more relaxed but has times of "3 year old behavior" surprised she is so much better at school and about the same at home
Summary and Comments		has greater self confidence but has definite areas of insecurity, perceptual difficulties present speech improved, drooling stopped, a child who still fears his resentful feelings (over being different) will erupt	previously in an effort to please and be accepted he struggled with his handicaps, developing increasing tension; now he is more relaxed, speech improved, ego development has occurred but brings concomitant anxiety--is there also anxiety due to greater recognition of the deprivation caused by handicaps	thru speech therapy and group, has gained in communication; may tend to control parents by pretending not to understand their demands as was once true; handicaps serving secondary gain at home; not needed at school where environment consistent

TABLE 169--Continued

Variable		Subject		
		E-1-10	E-2-3	E-1-4
Intelligence Clinical Impression		average	low average	capacity for low average
Appearance	Pre	handsome; well developed	handsome; well developed; neat	stocky; overly plump socially comfortable
	Post		no change	no change
Attitudes	Pre	coy; silent except when he forgot himself	friendly; eager; frustration not obvious	expected to be waited upon; cheerful; unconcerned about damage to toys
	Post	somewhat friendlier	"	cheerful; self-satisfied
Behavioral Observations Characteristics	Pre	communicated angry feelings non-verbally, in play; took suggestions readily sensitive to noises not easily distracted no hyperactivity	took pleasure in activities; perseveration; interest span limited, reflects dull normal intelligence; no hyperactivity	general enthusiasm almost active short attention span
	Post	Essentially no change provocative; silence prevailed, perseverative (?)		waited quietly for his appointment; more controlled and orderly
Play Activities	Pre	shot Indians off the roof; tomahawked cowboys; with encouragement, hit Bobo with abandon took out doll furniture and replaced it disorganized; made a clay bullet and knocked down girl, mother, boy and father in that order	concentrated on Bobo hitting squarely and increasing intensity only observed toys; played checkers well struggled to replace a series of various sized blocks	short attention span painting cheerful but formless; played with trucks mostly; played with and then threw train into stack of toys; didn't seem interested in rules; moderate pleasure from Bobo
	Post	more active pushing away of the punching toys	even greater interest and emotion displayed with Bobo	still satisfied to identify trucks and push them around; less interest in Boxer than in Bobo
Motor Patterns Coordination	Pre	normal gross and fine movements	gross = good fine = impaired; could not hook trucks together	difficulty joining parts of trucks
	Post		no significant change	no clear data
Draw-a-Person	Pre		primitive; insect with eyes outside of head	birdlike; cheerful large head
		primitive, lacks self-concept; poor spatial concept, i.e., windows arise out of house wall	eyes now inside head; otherwise the same	less birdlike; still cheerful with large head

TABLE 169--Continued

Variable		Subjects		
		E-1-10	E-2-3	E-1-4
Orientation Memory Time Space	Pre	disoriented	form concepts very poor	marked spatial disorientation; couldn't give dates, months
	Post	continues	still much difficulty but improved now knows month	
Despert Fables Phantasies Dreams and Wishes	Pre		daily nightmares but happy endings	bird would go to mother; elephant turned brown; he would lose the toy
	Post	wishes for a horse	average wishes	not tested
Speech and Language	Pre		"baby talk" plus omissions and substitutions; history of stuttering	constant talker, questioner
	Post		moderate improvement but still immature	no change; irrepressible flow
Parent Conference	Post	Mother attended: petite, well groomed	Mother attended: still overprotecting	Mother attended: feels guilty and responsible, but also blames lack of kindergarten
Parent Evaluation of Child	Post	sees no real difference; "anything he does wears off fast." still has "terrible temper," won't obey; moderately accepting of a residential treatment center	no significant changes within family; child more independent; has always preferred physical things to talking	"wonderful progress;" increased attention span
Summary and Comments		the use of silence and play activities express his hostility and fear of aggressive drives in a family which has real difficulty accepting an alert outgoing male child in other than an inconsistent, somewhat seductive fashion; greater ease with peers; has profited from brief psychotherapy	this appealing, aggressive boy has had such marked perceptual difficulties that he needs both group experience to help his self-concept and concomitant individual speech, eye, and form training to establish realistic communication with the environment	this child uses cheerfulness and enthusiasm to hide feelings of inadequacy; verbalization as a defense against overprotection and as expression of aggression ; he is now more controlled, can permit reading to occur (let something through the verbal barrier); still immature

TABLE 169--*Continued*

Variable		Subjects		
		E-1-2	E-1-3	E-2-9
Intelligence Clinical Impression		facile tongue but demonstrates no more than average intelligence	greater potential	retarded
Appearance	Pre	pudgy, large mouth constant drooling	attractive pigeon-toed	very neatly dressed thin, obviously handicapped
	Post	no longer drools		greater air of self-confidence
Attitudes	Pre	friendly, cooperative, shy	friendly independent	willing, no separation problem (from father) cooperative polite
	Post			
Behavioral Observations Characteristics	Pre	quick rapport but superficial, fair amount of hyperactivity, perseveration, occasional grasping of trouser crotch	refused help with lids of paint jars, opening doors etc. perseveration, no hyperactivity	played quietly alone but expected toys to be brought to him by examiner, perseveration, not hyperactive
	Post	asked many questions checking whether other boys had been here too; more obvious masturbatory activity	essentially sane	less fearful of falling on stairs placed examiner in role of teacher to agree with his play
Play Activities	Pre	"loved to fight"-as he hit Bobo, used finger paints, washing hands between colors	eager to spend time with Bobo and finger paints-became very aggressive saying to Bobo "I'll kill you" washed hands between colors, emphasized painting	pushed trucks back and forth, no story identified puppet family once more, no interest in Bobo or punching bag
	Post	mostly hit Bobo	further attack on Bobo-never slowed down by the marked pigeon-toed gait freer use of colors in painting house and sky; emphasized Bobo	could fit lock blocks together now, felt safe enough to pat and then push punching bag
Motor Patterns Coordination	Pre	heavy gait, clumsy constant drooling (seemed oblivious to it) jerky when drawing, free when coloring	pigeon-toed, gross and fine movements normal	under stress: a myoclonic and choreoathetoid repetitive complex (5 or 6 times)
	Post	no		improved coordination complex occurs (3x) learned limb movements
Draw-a-Person	Pre	bald man with crayons, stick figure	compatible with poor form concept	cooperative a) grotesque figure of boy b) trailer but vaguely depicted
	Post			stated it was a puppet

TABLE 169--Continued

Variable		Subjects		
		E-1-2	E-1-3	E-2-9
Orientation Memory Time Space	Pre	disoriented	disoriented	mounted stairs so that both feet on step, as tho uncertain of spatial arrangement, similar to 4 year old
	Post	continuous		
Despert Fables Phantasies Dreams and Wishes	Pre	feels things up against his face wishes to walk with father		mumbled words
	Post			replied "nothing" on wishes
Speech and Language	Pre	impaired but had clear moments quite verbal	unclear consonants missing: could "catch on" to his meanings, organic origin, appeared unconcerned	severe speech impairment, a rare sentence
	Post	improved	improved, expresses ideas more clearly as well as the words themselves with speech training	speech is more distinct
Parent Conference	Post	Mother attended (known to examiner in other setting) demanding, intelligent, dependent-has only high expectation for son	Mother attended--do not feel parents push him, child not troubled by competition from a younger sibling	Father attended-recognizes "we have spoiled him I guess" he thought too, they needed guidance, feel they have tried to be firm--do not see themselves manipulated although child tries this
Parent Evaluation of Child	Post	most pleased that he comes home without complaints-feels he is more bothered now that he has learned enough to see how wide the gap which separates him from the neighborhood, "defeatist attitude?"	easier to handle, a happier child-used to come home from school tense and irritable,"now he fits at school" social adaptation hard at home, few playmates his age-speech better-still an eating problem	could not say enough about the improvement they see-more independent, less scared has clear concept of playing as something more than going out and moving around, parents are too optimistic about his catching up
Summary and Comments		while the speech defect has diminished, this boy is markedly immature and has primary emotional problems, as a member of this family-complex; there is a kind of castration anxiety symbolized by the non-acceptance of his intellectual limitations	much anxiety is reflected by his aggressive play and is dealt with reasonably well by compulsive defenses, of late, some of this energy seems free of fears and more normal "boy spirits" less internalizing	there is obvious CNS damage along with psychogenic myoclonus under stress (which he can stop at will) autistic-like behavior has lessened but with limited assets and little guidance; he tends to give up and isolate himself

TABLE 169--Continued

Variable		Subject		
		E-1-6	E-1-9	E-1-5
Intelligence Clinical Impression		greater capacity	moderate mentally retarded capacity puzzling	average
Appearance	Pre	friendly, likeable eager	friendly,"handicapped" cooperative	drooling
	Post	friendly, likeable subdued	no change	no change
Attitudes	Pre	willing, displayed prowess	strongly motivated to learn, carefree friendly	denied neuro handicap, no respect for property or command begged not to have interview
	Post	willing, liked school, liked reading best	loves school, too friendly	less respect for property now
Behavioral Observations Characteristics	Pre	independent,took initiative, distractible, perseverative, no insight for errors of spelling	sucking noises, humming, infrequent marked perseveration quite relaxed	annoying teasing, provocative, pretended not to hear questions, moderately restless, begged to continue play interview, unpredictable
	Post	less distractible, perseverative masturbatory movement	little perseveration masturbation	less teasing, less "I'll show you" accepts limits 25 percent (before 0 percent) unpredictable
Play Activities	Pre	liked to punch Bobo liked to draw, fingered doll furniture but had no people or plot	appropriate relish punching Bobo and bag, most of time with small train or joining sections of fence	moved doll house furniture, scant attention to Bobo
	Post	didn't punch Bobo cars, Schmoo family bumped against table	immature, bulk of time, hit Bobo also used same train again	much fanciful talk "owns a subway in New York City" made overture to finger paint
Motor Patterns Coordination	Pre	difficulty joining trailer to truck cab	poor gross, right hand for drawing left hand for punching	residual of right hemiparesis
	Post	no change	fine: poor	
Draw-a-Person	Pre	gaunt, grotesque boy "PDDIE" (Eddie his brother)	markedly immature	with urging "boy whale"
	Post	insect, boy, self "Douglas"	"happy man"	

TABLE 169--Continued

Variable		Subject		
		E-1-6	E-1-9	E-1-5
Orientation Memory Time Space	Pre	disoriented	disoriented but named day and month of birthday	disoriented
	Post	disoriented except after hearing data on that day	time sense presents good concept of Schmoo family	no change
Daydreams Phantasies Dreams and Wishes	Pre	non-commital changed topic		
	Post			
Speech and Language	Pre	immature, intelligible	defect definite moderate	
	Post	normal		
Parent Conference	Post	Mother attended: intelligent (mother) cooperative, over identified with child	Father attended: says makes friends knows meaning of "no" discussed readiness for sex education; masturbation infrequent	Mother attended: stressed the value of 3 years' parent counselling for family
Parent Evaluation of Child	Post	settled down a good bit, some improvement expressing positive or negative feelings eats better, not as enthusiastic	Father has found much improvement feels subject is more accepting, fewer tantrums, whining	more independent more mature in most respects, can be trusted with key to apartment
Summary and Comments		less anxious, bitter integrated but perseveration continues and there may be anxiety manifested in masturbation movements, speech improved, perceptual difficulties less apparent, currently has much anxiety arising from newly discovered awareness of how handicapped he is	emotional growth occurred, still a mentally retarded picture, masturbation role unclear, coordination still poor, over-all good improvement	has made significant gains in inner control, less need to engage in power maneuvers, definite aggressive drive still present

TABLE 169--Continued

Variable		Subject		
		E-2-10	E-2-1	E-2-2
Intelligence Clinical Impression		not significantly retarded, appeared depressed	depressed, capacity far greater	average or better than average
Appearance	Pre	younger and smaller for age, strangely elongated head leads to old looking face wears glasses	good looking, solid large for age	friendly, smiling wears Denis leg braces, looks older and studious because of glasses
	Post	as before except no longer needs glasses	"dressed up" in summer clothes but still remained boyish	
Attitudes	Pre	cheerful, pleasant friendly, cooperative	cooperative, wary "this is baby stuff"	not overtly bothered by appearance, good sense of humor
	Post	as before		
Behavioral Observations Characteristics	Pre	fun-loving, curious accepted limits moderate perseveration, no hyperactivity "whow" adequate attention span	polite attention slow to engage perseveration, relaxed in hour "finger painting is too messy" in a drawing mood, sant to self and clicked tongue softly, watched adult reaction	preferred conversation, moderate perseveration, no hyperactivity, adequate attention
	Post	more relaxed	definitely interested, more relaxed no perseveration	more active, more aggressive, clutched at crotch of trousers occasionally
Play Activities	Pre	"oh! I love to draw" intrigued by wind-up circling train, little interest in guns, Bobo (but he owns latter) belated interest in finger painting but picture of pleasing color	couldn't explain why Bobo didn't bounce back, rejected checkers slightly interested in wind-up train made Play-Do female pressed face down followed Old Maid rules	hit Bobo with gusto using both hands but no strength, cowboys and Indians plot "goodies or baddies" but placed people without actual fighting
	Post	succeeded surprisingly well with difficult puzzle, by using trial and error method	less compulsivity to finger painting but still used a spoon decided to "mix them up" drew a Jap battle	threw Bobo upside down, at the window, against examiner
Motor Patterns Coordination	Pre	bizarre motor pattern tremors-twisting of limbs, pill-rolling good coordination otherwise	normal gait coordination	right arm spasticity and choreo-athetoid movements
	Post	bizarre pattern absent, residual remain in arms and fingers but only occasionally present, left handed	now seemed "loose hipped"	
Draw-a-Person	Pre	talented quick action of cartoonist, demanded to take a picture home, cheerful stick man with some filling & with shaded pants	"baloon pumpkin" figure with centipede legs, drew his family people, his is most immature, all figures all figures had long hair	little boy with prominent arms, round feet, "everybody has feet"
		captivating little man resembling Herbie in Smitty cartoon well proportioned acceptable for age level	drew his pictures with vertical lines but with fun picture of "you" improved spatial concept	2 bearded men with backs drawn on reverse side of paper, immature figures but clever idea

TABLE 169--Continued

Variable		Subject		
		E-2-10	E-2-1	E-2-2
Orientation Memory Time Space	Pre	asked the time frequently	"I just let time go by" disoriented	
	Post	remembered activities of last hour in playroom	oriented to date	
Despert Fables Phantasies Dreams and Wishes	Pre			baby will hop to M or F, probably M elephant's trunk was blown off by a high wind 1) horse, 2) all the soldiers 3) all the money
	Post			continues with active phantasy life same reply to elephant fable, wishes for a horse
Speech and Language	Pre	obvious stutter, trying hard to apply lessons from speech therapy, 4 times spoke easily without stutter	normal speech	marked abnormal "cluttered"
	Post	stutter markedly diminished		much improved
Parent Conference	Post	Mother attended: tries to hide concern over relative lack of academic growth, pleased that he will talk about school activities we discussed present and future problems relating to adjusting to a younger and precocious brother	Mother attended: Father with him (and her) more-we were both young and needed to learn what to do-now we talk things out, Father said to be "very shy"	both parents attended asking for specifics undercurrent of doubt asked to discuss finding of "immaturity" believe they were satisfied
Parent Evaluation of Child	Post	much impressed with emotional and social maturity growth, not comparable academic growth, stuttering much less, no apprehension over meeting new people, especially doctors, difficulties in neighborhood play because of size and poor game concepts	is much happier--can accept difficulties can make a mistake in reading now and it is OK but lacks confidence when reading to Father "comes out with his feelings"	accepts sleeping in his own room, expresses more complicated thoughts, stuttering more recently greater manual dexterity, follows Father's effort to build more models with him, diminishing dependence on parent participation in play
Summary and Comments		there has been marked ego development, less stutter, and disappearance of bizarre motor tic, predominant difficulties are with language not form, emotional tensions are secondary to adjustment problems arising out of handicaps, and will continue to require guidance	there has been growth and the neurotic picture is now absent but moderate anxiety (hesitancy) is present; the feeling of acceptance and achievement has still a doubtful permanency, definite reading disability still	this physically handicapped child with marked speech and reading difficulties has lost some of his maturity, improved his speech, and increased his use of normal developmental pathways; is more self reliant but not without anxiety-trouser clutching at the crotch for example

TABLE 169--Continued

Variable		Subject		
		E-2-6	E-2-4	C-1-7
Intelligence Clinical Impression		low average? greater capacity		greater capacity than evidenced
Appearance	Pre	small, especially face, a lot of hair grimaces	solemn, serious neat, average height	"round": face, eyes, body, neat
	Post	no difference	unchanged	no change
Attitudes	Pre	wanted constant physical contact, personal basis to to all talking teasing	cooperative, conforming, thinks he's dumb	impersonal cooperative
	Post	more interested in asking than answering	continues	eager, impulsive
Behavioral Observations Characteristics	Pre	markedly hyperactive perseverative speech ground her teeth poked examiner with whatever was handy tried biting once kissing and asking to be kissed	passive, relaxed during hour left hand preferred	restless, hyperactive perseverative, rather than move the ranch house from oncoming train said, "can't play with train now, it is destroying my house" distractible artistic movements
	Post	no teeth grinding no further kissing		still concerned with whether air conditioner (self) was protected by a screen less hyperactive
Play Activities	Pre	no interest in Bobo desultory train play, disorganized card games	elected checkers, not timid but didn't "see" moves could become absorbed in game	poked feebly at Bobo, opened closets, investigated everything preoccupied with piece of heat lamp equipment, put train away when he saw it would not go in straight line " " Play Doh into bar, placed it away
	Post	same messy painting primitive circles		much more assurance when knocking Bobo, even caressing it
Motor Patterns Coordination	Pre		g = average j = suggestive delay	within normal limits but when tense, a little awkward, right handed
	Post			more at ease spatially on high places
Draw-a-Person	Pre	bizarre, called hands "wings" brief interest	small head but otherwise well proportioned, detailed tall man	cooperative of the picture, said in low voice "I don't know the difference between them"
	Post	declined	undecided whether man or boy, less mature but well proportioned	

TABLE 169--Continued

Variable		Subject		
		E-2-6	E-2-4	C-1-7
Orientation Memory Time Space	Pre		disoriented to time	stated it was not wintertime "or I would plug in the lamps, not just pretend
	Post			
Despert Fables Phantasies Dreams and Wishes	Pre	"not telling, you don't live with me"	baby bird would probably die, elephant has big feet, is heavier, nightmares, wants more friends	stopped listening when asked what baby bird did, became dreamy, said "my parents have not put me wise" avoided talk of dreams
	Post		"a million dollars" college	
Speech and Language	Pre	constant, rapid talk under pressure echolalia, some unclear	no spontaneity clear speech	used third person often, intervals of dreamy, incoherent language, often suspended
	Post	slower, clear		could engage in conversation
Parent Conference	Post	Mother attended: concerned, interested but holding herself under control regarding subject's future	Mother attended: begrudged him success, denies being told he has problems (has just returned from series of ECT) anxious to know whether we found improvement, Father thinks he is "just stubborn and lazy"	Mother attended: intelligent, perceptive, impulsive, helpful in analysis of child's symbolic language, writes voluminous reports to teachers and therapist, many detailed observations, helpful
Parent Evaluation of Child	Post	definitely improved less restless "has a ways to go"	seems a little happier on his good days, "doesn't meet our high standards"	has settled down a lot, can be trusted to "stay put most of time" assumes routine chores, decreased demand for parental attention at merest whim, now likes school, so not worried and upset each morning
Summary and Comments		a prepsychotic child with anxiety, ambivalence who has integrated somewhat through help in structuring her relationships at school but is still unable to deal with her instinctual drives on a continuing basis away from the group, is no longer feared, not violent	chronologically anxious, passive child with a psychotic mother and busy father who has begun to express resentments, is slow more self-confident, has strong desire for Father's approval, perfectionistic, generally improved	has maintained reality contacts for longer periods before regressing to symbolic verbalization or activity, organic etiology may be debated but whether weight is given to these components, his response to stress has been a schizophrenic one, times are decreasing when this defense necessary

TABLE 169--Continued

Variable		Subject		
		E-2-8	C-2-4	C-2-3
Intelligence Clinical Impression		average	low average; capacity for average	seems bright and alert
Appearance	Pre	pleasant, shy handsome	wiry, well developed, shows Latin parentage	small for age, dark eyes and long lashes, thin
	Post	less shy		filled out
Attitudes	Pre	curious	willing, cooperative loathe to go	cooperative, self-examining: "people say I'm tricky. I guess I am but don't mean to hurt anybody" cocky
	Post	less unhappy with himself; more trusting	less anxious; cheerful	happy; no longer needs to brag about "socking another boy"
Behavioral Observations Characteristics	Pre	moved purposely and deliberately; bothered by mixed colors in same paint jar; aggressive but not hyperactive; acted out, destructive feelings	hit Bobo with gusto, unaware of which hand he preferred; bothered by poor puzzle performance, especially lack of success on first attempt; no hyperactivity; short attention span; no perseveration	much more talk than play; calmed down after "making as much poise as I wish;" much self-awareness and concern for others; not hyperactive
	Post	less aggressiveness	excited but controlled; amenable to suggestions; eyes lit up when school mentioned	entered quickly, happily; perseverated on shooting doll house family until examiner pointed to the Boxer
Play Activities	Pre	gave Bobo "bloody nose" methodically turned doll house upside down; returned to operate on Bobo; painted "deshorashin" very primitive; interested in watching turning train wheels	stuck to rules of card game but got lost in each step; opened Play Do tin but soon lost interest; took several splotches of colors at one time for finger painting, instead of the usual one at a time	quickly took gun and shot all the people in doll house; turned furniture upside down all family members hit each other except child hitting adult; modeled a corral fence and then pounded away with gun butt for 10 minutes
	Post	participated in friendly fashion with patching of Bobo; no interest in dollhouse	"let himself go" in hitting Boxer and shooting clay bullets	shot people in house until turned toward Boxer
Motor Patterns Coordination	Pre	all movements adequate	normal gait, good muscular strength some clumsy fine movements with playing cards, awkward if hitting Bobo, graceful if drawing	excellent coordination but knocked toes against heel of other shoe
	Post		better over-all coordination	right side better coordinated
Draw-a-Person	Pre	refused a person	enjoyed this; surrounded the 2 stick figures (boys) with grass, blue clouds & buzzards which father would kill; somber colors	
	Post	stick figure with big fat arms; no ears, pupils	drew his 14 yearold sister-all details good picture	3 primitives-1 with each hand & 1 with both (latter best). "I don't believe I'll ever know the difference between women and boys."

TABLE 169--Continued

Variable		Subject		
		E-2-8	C-2-4	C-2-3
Orientation Memory Time & Space	Pre		didn't know birth date, nor care	disoriented for time
	Post			
Despert Fables Phantasies Dreams and Wishes	Pre	"didn't know about bird's nest;""trunk gone" off elephant	bird would fly away, elephant was different because exchanged for tiger	wishes: 1) horses 2) 6 guns 3) new family at times; occasional nightmare
	Post	still non-committal about bird's fate		1) horse 2) real guns 3) wants policeman to OK shooting BB gun anywhere
Speech and Language	Pre	immature but improved when relaxed	moderate stutter	not remarkable
	Post	still immature; no spontaneity except a question about the train	more spontaneous, even; quite talkative; some stutter but less	
Parent Conference	Post	Mother attended: pleasant and appreciative, but kept conversation on superficial level	Father attended:has 7 children; seemed relaxed, sensible; rotates 3 sons on archery dates per weekend; feels his wife is hard on son, not always his fault "who is she to criticize his speech--hers is not right--or about spelling"	Mother attended: a concerned, interested intelligent parent who wanted to discuss the present and future problems developing between siblings where younger brother is precocious; concerned about need to give sex facts (F wants her to)
Parent Evaluation of Child	Post	"a different boy;" not on fringe of group; gives and takes; more relaxed at home with siblings	"has come along;" greater self-confidence, but added "truthfully don't see him often enough to notice any real difference"	"has matured tremendously since" a new drug (unknown) was discontinued; accepts responsibility of AM routine without "buckling under" better liked by group because he has concept of the games & doesn't muddle up the playing
Summary and Comments		along with perceptual and speech problems, child had a well defined neurosis (hysterical & compulsive); he found relief (from castration anxiety) through acceptance and achievement at school; this led to increased self-confidence, greater group participation; more immaturity now than neurosis	motor incoordination immature speech? mental retardation, short attention span have been modified; greater self-confidence is related to decreased anxiety and school achievement; source of present anxiety is partly rejecting home situation; cannot establish (acceptable) identity	a child with a convulsive disorder who has begun to develop inner controls; still reflects much anxiety related to seizures, perceptual problems and his small size; realistic threats posed by precocious younger brother; may be well advised to have psychotherapy as adjunctive support

TABLE 169--Continued

Variable		Subject		
		C-2-7	C-1-4	C-1-3
Intelligence Clinical Impression		alert, intelligent	decreased functioning	potentially average or above average
Appearance	Pre	ultra-serious; big blue eyes peer out of large framed glasses; earnest manner; scar between eyebrow and nose	long, narrow head; marked drooling which he brushed away	smiling; alert; friendly
	Post	continues to be a loveable Mr. Funny Face	same	no change
Atti-tudes	Pre	willing to draw; wistful	quiet; gentle, willing; needed permission	
	Post	same	same	
Behavioral Observations Characteristics	Pre	stood with feet twisted about one another, leaning against E's chair or desk; talked with adult inflections, rolling back & forth on his heels; did not back away from E-reported afraid of strangers by mother	neat, methodical; planned ahead on play activities; didn't believe rules about Play Doh applied to him too; tended to ignore, avoid E's conversation, especially regarding home relationships; perseverated	accepted suggestions tendency to give up; could discuss rules of checkers, reach a compromise without sulking
	Post	now went back and forth in front of E occasionally but stood still most of the time, hands in pocket	essentially sane	no longer gave up; more aggressive
Play Activities	Pre	noticeably disinterested in dollhouse, clay, toys; stories told revealed intensity of violently aggressive feelings	painted cheerful rainbow; turned to trucks and then to cowboys and Indians made permanent balls of Play Doh, fascinated with it, mouthing it; uncertain toward end; no interest in going	immediately seized trucks, cowboys, Indians, but merely lined them up--no plot; expert hitting at Bobo; suggested "Go Fish," knew correct rules; played checkers; perseveration tendency
	Post	spent much time knocking the Boxer about, but still showed no interest in other toys, guns	began again by drawing; tired of it and then also of Play Doh; didn't grasp idea of forms of different sizes within each other; "fixed up" dollhouse, placing mother and little girl within	spent most of the time hitting Boxer, then knocked down wooden figures with gun and clay bullets
Motor Patterns Coordination	Pre	seemed normal	slightly awkward gait	grand right hand uppercut; quite good coordination
	Post		still present	
Draw-a-Person	Pre	willing to draw his friend; one large ear partly painted green	rapidly drew boy and flower of equal size-only slightly immature	drew stick woman, but complex, transparent house
	Post	drew a very small stick figure (boy); made a cat 3 times larger; drew a little larger person, not a stick person	split level house colorful	could not be diverted to drawing

TABLE 169--Continued

Variable		Subject		
		C-2-7	C-1-4	C-1-3
Orientation Memory Time Space	Pre	oriented to day and birthdate	disoriented	
	Post			
Despert Fables Phantasies Dreams Wishes	Pre	compulsive need to make up ego-building stories, 99 percent concerned violence; elephant's tail grew trunk in back too; afraid of alligator	dreams about flowers cowboys, bad animals (crocodiles)	"gee, I don't know" response to fables; apprehensive; finally said baby bird went to M's tree; elephant tusk broken off; denied dreams
	Post	no longer needs to tell tall tales to gain status, identity		
Speech and Language	Pre	profuse, outpourings adult inflections; slight British accent remains	immature; sentences often were fragmentary and hard to understand	noticeable defect but intelligible; child unconcerned
	Post	more realistic conversation	still hard to understand	no significant change
Parent Conference	Post	Mother and stepfather attended, both English; SP quiet & able to look realistically at problems; Mother now agrees Special Education is right school; now, complained about U.S. schools last fall	Mother and Father attended; both quiet Mother took lead; mindful of son's limitations; cooperative but feared questions as though to hear prognosis was even poorer	Mother attended; wishes he read like 2 younger sisters (F doesn't read much) but does not push him; M is somewhat afraid of authority persons
Parent Evaluation of Child	Post	is socially better, but friendships "peter out if he goes to a child's home-wonder what parents are telling their children;" believes eye operation, several house moves, plus absent father contribute to anxiety	much more independent; plays away from home but sets own limits; no wandering; no longer cries when left alone with strangers; worry about speech preventing rapport; has made effort now to seek peers	more responsible-and no fussing about baby sitting; cleaned room; doesn't sulk when his baseball team loses; has always played well with peers
Summary and Comments		a clearly disturbed child whose intense feelings and rich phantasy life suggested a psychosis but who was still well integrated; has gained enough security and feeling of adequacy to drop much of his compensatory story-telling and phantasy life	he fell apart when not able to use compulsive routines to handle anxiety derived from mental retardation, poor speech, immaturity; autistic-like modes now replaced by desire to communicate; considerable social and emotional growth	marked speech difficulties; perceptual problems have created anxieties, especially in learning areas, but ego rather well preserved; has improved speech and social ease; awkward gait but good arm coordination

TABLE 169--Continued

Variable		Subject		
		C-1-10	C-1-2	C-1-6
Intelligence Clinical Impression		retarded	alert, average to above average	even allowing for expressive aphasia, appeared retarded
Appearance	Pre	stocky, bullethead, big	asthenic, well built dark, neat, small	stocky, pleasant, babyfaced, blond
	Post	same	same	"put on a serious face to act like a grown up and behave myself"
Attitudes	Pre	anxious, temper tantrum, interested in spite of himself	friendly, outgoing, says his teacher thinks he is poorest in class-he does not	friendly, willing
	Post	same	more relaxed; no more self-deprecation	same
Behavioral Observations Characteristics	Pre	mounting resistance, increased crying and wish to return to his mother; soon played weepily and unconcernedly with a train; tantrum controlled by fear of spanking by father that night	not hyperactive; organized but not compulsive play	somewhat short attention span; wanted to take home a small car; perseveration?
	Post	separation anxiety continued	essentially same	perseveration evident; marked dependency needs
Play Activities	Pre	sized up principle of the switch to a train, asked an appropriate question about why it always went in a circle; hit Bobo until he remembered his mother	cowboys and Indians-originality in placement of men; lack of realism as to danger to a lone Indian on roof	10 minute story about cowboys, Indians using puppets; destroyed the E both as witch, as Indians; limited plot; longest time spent with several guns; copied lunging and diving of prize fighters but punches were wild at Bobo
	Post	same ambivalence about enjoying himself away from mother; quickly saw relationship of Schmoo family	stuck with Lok Blocks until he completed a house	no interest in anything but guns; shot down a man first; and then whole families; "whoshall I get rid of now?" E asked why--"they are too busy."
Motor Patterns Coordination	Pre	normal gross coordination	good	fair as seen in hitting Bobo
	Post			
Draw-a-person	Pre	"I'll draw something and then that's all"-weeping drew boy; started to throw pencil and then replaced it carefully	boy with catcher's mitt is reaching for a ball--plus tall orange tree	liked to draw--boy hit Bobo; resembled beetles
	Post	drew, standing in the doorway, grotesque, baldheaded man with wings for arms, and detailed belt and buckle	"we've been practicing at school;" small, thin, smiling boy	

TABLE 169--Continued

Variable		Subject		
		C-1-10	C-1-2	C-1-6
Orientation Memory Time Space	Pre	disoriented	"not interested; mother keeps a calendar	disoriented
	Post			
Despert Fables Phantasies Dreams and Wishes	Pre	has nightmares, sometimes afraid	"if a baby bird, it goes to mother; if older, goes to own tree;" goes to both mother and father when worried	confused when asked 3 wishes; spoke gibberish out of anxiety
	Post			
Speech and Language	Pre	clear	muddled, immature alternated with clarity	motor aphasia; has been in therapy and is improving; made real effort and only occasionally was unintelligible
	Post		clear	
Parent Conference	Post	Mother and Father attended; Mother feels she has overprotected bacause she is lonely and fearful; misses hometown support which she had for 2 older girls; doesn't get out much; will spend summer with cousins again in country	Mother attended; wonders "now and then" whether "being special is good for him but everyone knows he needs to build up his self-confidence" sandwiched in between 2 sisters who are avid readers and honor students	Mother attended (brought baby and 3 year old); was relaxed, intelligent, concerned; does feel that he would like more of Father's time and attention
Parent Evaluation of Child	Post	much improved; more independent; reminds them his teacher said he should do more himself; plays with other children now; "he doesn't cry half as much now;" cries when stress put on routine and departure from it	"no doubt his school experience has been profitable;" Mother has 5 children and seems to have some understanding of needs; impresses as hoping he will grow up without too much attention from family, conserving her energies	"more confidence;" no longer fears dogs feels this is explained by better speech; also sees him as asking questions he can answer to satisfy dependent needs
Summary and Comments		this summer markedly dependent, immature child has a minimum of perceptual problems; a certain amount of weaning has occurred but he remains anxiety-ridden at separation and in need of much reassurance	along with an apparently specific reading disability, there is an immature emotional pattern which has been modified, especially in speech area; but child is held back by family attitudes as though they asked to slow down what they admit is an inevitable "growing up" process	while there has been a gain in independent behavior, dependency is still marked; aggressive drives secondary to expressive aphasia are intensified by advent of new baby; needs more feeling of belonging and sense of accomplishment; would also diminish rhetorical questioning

TABLE 169--Continued

Variable		Subject		
		C-2-2	C-2-9	E-1-7
Intelligence Clinical Impression		average if not potentially superior	definitely retarded	depressed
Appearance	Pre	neat pleasant elfin quality	neat pleasant	well developed, thick glasses neatly dressed
	Post			no change
Attitudes	Pre	friendly, irrepressible	friendly, cooperative, shy	willing, quiet relaxed, curious
	Post		same quiet	friendly, reached up with his hand for the examiner on leaving his mother
Behavioral Observations Characteristics	Pre	mischievious, attempted to tell or play jokes, continually tested limits genuine, spontaneous remarks, spontaneously put toys away, hyperactive	needed guidance and permission to involve himself	free arm movements when painting, seemed to be enjoying himself, preferred larger chair
	Post	same boundless energy difficult to follow directions, would not take "no" for an answer until he saw it was really meant	same quiet, passive behavior, perhaps less at ease	zipped his trouser fly a moderate amount throughout the hour
Play Activities	Pre	joined the fence sections easily, telling phantasy played card games, hit Bobo and punching bags but preferred the pop gun	tentative punches at Bobo became stronger, drew a star	most anxious to paint utilized many colors played cowboys and Indians, talk to self but unintelligible, no interest in Bobo, bag, or clay
	Post	talked as he played mostly with Bobo, drew a fort with Nazi guns and told a story	punched Bobo but it was starting to leak air, wrote name in a pleased fashion, one undetected error	cowboys, Indians persevered with attaching fence sections with encouragement
Motor Patterns Coordination	Pre	gross and fine movements good, shuffled cards like an expert	straight legged gait big and important organic sign? tremor of right arm unrelated to activity, time of day, etc.	normal gait and manner, coordination adequate
	Post	good right hand punch		
Draw-a-Person	Pre	"I will draw you--was large rabbit, second was "here's you in your underwear out in the wetting (cloudburst outside)"		spidery person (same as 1955)
	Post	started same way, but diverted, drew a boy	quite a primitive boy (ears and arms missing) much tension	refused to draw person but chose a purple train, windows appropriately placed

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TABLE 169--Continued

Variable		Subject		
		C-2-2	C-2-9	E-1-7
Orientation Memory Time Space	Pre	knew his birth month! guessed at year	knew age, birthday is "just half past" disoriented to time	gave month only, correctly
	Post			
Despert Fables Phantasies Dreams and Wishes	Pre	wants 1) to fly like Superman 2) all the magic in the world 3) jet plane	the baby bird went to another tree, there was another baby with the elephant, many dreams of bears	tried to make clear his wishes but mumbled
	Post		wishes: toys, cars, trucks	
Speech and Language	Pre	in speech Rx for noticeable defect but always understood	no spontaneity	severe speech defect articulatory and omissions, persisted in trying to talk, considered organic
	Post	talked rapidly with adequate vocabulary	continues passive has slight lisp	marked improvement but no spontaneity yet
Parent Conference	Post	Mother attended: finds it hard herself to get anything done she should do, cannot discipline son	Mother attended: feels guilty about neglecting son for foster children, also little time with son alone; more concerned than she realizes with his academic progress	Mother attended: somewhat older-sees difficulties and active sibling competition with 7 year old sister, at verbal level-less flattering picture emerged at end of interview
Parent Evaluation of Child	Post	has not seen "too much change"-you have to sit on him still-but he gets along within a larger group now, is apt to be critical and unforgiving of the trouble caused by himself	gets along better with peers, more independent, "can dress himself, etc," goes off by himself rather than try to get his turn with his Mother, "has the best memory of any child" "sensitive and appreciative of nature"	"I can't tell you all the things"-greatest gains in speech-but "is more certain of himself" fewer tears and temper tantrums (rare), accepts correction and suggestion- "no longer in a shell"- but also he is "still a little nervous"
Summary and Comments		while there continues to be difficulty with impulsive control, there is a healthy reaching out; the behavior patterns are reinforced unfavorably	he appears to have made academic progress but remains essentially passive and ill equipped to compete for his emotional needs within a large family; mental retardation is a factor here too	history of abnormal EEG along with speech problem-indicates organic problem with secondary anxiety and immaturity; doggedly works at speech, with positive results-while greater self-certainty is present, child is acutely aware of his "differentness"

TABLE 169--Continued

Variable		Subject		
		C-2-5	C-2-1	C-2-8
Intelligence Clinical Impression		definite retardation but felt to have a higher capacity	bright	moderate retardation
Appearance	Pre	toeheaded, neat, younger than stated age, beatific smile	thin, wiry, rabbity facial grimacing	large for age, neat
	Post	usual smiling self	no tics	
Attitudes	Pre	friendly, quiet	quiet, evasive at times	is aware of intellectual limits but not overly concerned friendly, warm
	Post			
Behavioral Observations Characteristics	Pre	constantly sought approval, good concept of how toys worked, neither overly neat or messy in painting proud of drawing	perseverated? or concentrated on Bobo, uninterested in clay, painting, etc.	took every chance to "show off" his learning but thereby revealed much difficulty, short attention span, obvious to consequences of his actions
	Post	tried to show he was in control of Bobo at least	reunion atmosphere hid in the cupboard briefly playfully this time, more controlled approach to finger painting, shooting, accepted suggestions readily	squeally laughter, less distractible
Play Activities	Pre	immediately drawn to Bobo, awkward, put fence sections together, persisted in trying to have all pieces upright at once, laughed at failures, enjoyed windup train going in circle	liked the planes; drew planes with bombs and told war stories, declined all other ideas	started to draw but turned to the wind-up train and then quickly to guns, running trains head on, much satisfaction punching Bobo
	Post	spent most of time with Bobo, sitting on him, shot Bobo "in his bottom" with B-B gun, stopped circular train with gun butt	much hitting of Bobo also of punching bag (alternate blows) tried gun, painting	much time with pop gun shifted to more organized play but still only with himself, was a train robber
Motor Patterns Coordination	Pre	left handed, awkward in pokes at Bobo, used right hand only	adequate, right handed	right handed, adequate coordination
	Post		better coordination	
Draw-a-Person	Pre	drew small house "nicer that way" person was grotesque because distorted in size and position	drew airplanes but refused to do person "I can't"	never did finish his drawing, distracted to toys
	Post	person immature, disproportionate but larger, hesitated before saying boy		happy-go-lucky stick figure who is smoking called "Dad"

TABLE 169--Continued

Variable		Subject		
		C-2-5	C-2-1	C-2-8
Orientation Memory Time Space	Pre		oriented to all modalities	knew birthdate and today's date
	Post			continues
Despert Fables Phantasies Dreams and Wishes	Pre			worried whether dreams would come true
	Post	after much thought and persuasion wished for a pony		wishes 1) croquet set 2) model stage coach 3) policeman's suit
Speech and Language	Pre	began to speak in sentences, no stuttering today	slight lisp	irrelevant answers; stream of consciousness but not psychotic proportions or quality, has slight lisp
	Post	speech muddled often by too broad and constant smiling, no spontaneity	more spontaneity	slight lisp present, especially if excited, continued flow of conversation
Parent Conference	Post	Foster Mother attended, recognizes the limitations of this child (and his twin)-has good picture of their needs and is warm, accepting	Mother attended-still worried and guilty about mistakes she made-no longer in treatment but husband is resentful of "spoiling" child-is perfectionist, uninterested	Mother attended-felt they and past school had reminded him of his bad habits rather than praising his good ones, praised the teacher's guidance, neurologist is tapering off anticonvulsant drugs
Parent Evaluation of Child	Post	"much better in every respect" listens, understands better, less "fidgety" rarely stutters now, participates now in neighborhood games, no longer on fringe	more independent, more realistic, but still hyperactive and fussy eater	"everywhere I look, he has improved," has learned to respect people of all ages
Summary and Comments		this child, known 2 years ago had made marked social and language progress before this study; he has continued to gain skills and self esteem (he is the more alert of the twins)-awkwardness and immature speech still evident, much is due foster home	while psychotherapy was stopped because of several factors, especially father's resistance, there has been a lessening of overt anxiety; but denial is still used to cope with family realities and he will not develop his potential until his parents use help	this child has been seizure-free but is on medication-he has had to deal with anxiety rising from handicaps plus family inconsistencies; these appear to be decreasing and with it, aggressivity; immaturity is prominent quality--were seizures primarily psychogenic?

TABLE 169--Continued

Variable		Subject		
		C-2-10	E-2-5	C-2-6
Intelligence Clinical Impression		depressed functioning		below average
Appearance	Pre	freckled faced, sandy haired, wiry	large size, smiling	sturdy, heavy large-boned
	Post			
Attitudes	Pre	groaned at going to playroom, loathed to stop	non-committal cooperative, not showing resistance	friendly, cheerful cooperative
	Post	usual friendly self more cooperative		
Behavioral Observations Characteristics	Pre	truly hyperactive in waiting room with his mother, sat still for the entire hour going from clay to crayon, very little effective coloring	superficial relationship because of poor speech quickly grasped concept of train switch low frustration tolerance, restless toward the end	opened heavy doors! compulsive about finger painting, wanted to keep painting, but compromised, issued order-like requests curious, enjoyed herself, not hyperactive
	Post	not distractible but active so as not to waste time, more spontaneous in movements		couldn't get concept of Schmoo family didn't want to try certain answers, relying on being cute and coy, transient stubbornness and sulking
Play Activities	Pre	direct wish to use Play Doh, was followed by action enthusiastic swinging at Bobo-only after brought to his attention (i.e. after permission received) rolled cars at each other to have large crash	spent most of the time with truck and self-winding train, hit Bobo with fair interest	attracted briefly to Bobo, clay, finger painting, straightened disorderly doll house with appropriate furniture but she put a large sofa across the front entrance and placed objects in line without imagination
	Post	marked activity, good work-out to Boxer and punch bag		less fuss about parting with drawing, squeezed Play Doh with childish patting
Motor Patterns Coordination	Pre		right handed normal fine coordination	hit with better than expected coordination
	Post			clumsy with toys
Draw-a-Person	Pre		a primitive house, which revealed difficulties with form "I can't draw a person"	preferred finger paint designs
	Post	drew a house all but one window (9) done with correct crow bars, other shows perceptual difficulty		disproportioned horse

TABLE 169--Continued

Variable		Subject		
		C-2-10	E-2-5	C-2-6
Orientation Memory Time Space	Pre		birthdate and present date unknown	did not answer
	Post			
Despert Fables Phantasies Dreams and Wishes	Pre	baby bird would stay in tree without the nest; described all but elephant's nose or trunk, but the elephant was torn up by another boy	wishes: "my sister took them" (not confusing dishes and wishes) denied troubles "didn't know" to fables	could grasp meaning of bird's nest fable but not recognize problem facing the baby bird
	Post	wouldn't commit himself to fables		
Speech and Language	Pre	fast and high pitched careless speech	structure and concepts were poorly developed	extremely immature, few words but could make herself understood
	Post			fuller replies but still no spontaneous speech-using non-verbal communications
Parent Conference	Post	Mother attended: tall, overbearing, calls herself "high strung," stoic;over-expectation; a certain detachment present-atmosphere of home not given-wondered why moved if doing so well-explanation seemed OK		Mother attended: thinks she may be "too close to the scene"
Parent Evaluation of Child	Post	didn't think there had been much improvement at home; think summer camp helped him		not as much progress this year as last year-but steady pace-has learned more about home duties-except can do own pigtails-with improved speech plays better with peers-not as hurt by friends' remarks-usual big sister ambivalence
Summary and Comments		he appears to have gained self confidence but still lacks insight into learning difficulties (see Mother's lack)-seizures only at home since 3; potential intellectual functioning may be higher but he is very anxious about failing his family's standards; tension flows out through motor activity	Mother's history of 10 foster homes prior to 16 years of age sets the stage for the very unstable home environment in which this child and his handicaps must try to develop-he is confused, immature, unrelated to most people and using denial and aggression as defenses	an essentially non-verbal child whose immature speech has improved and with it her social relationships but who relies heavily on cuteness and coyness to maintain her big sister family position; she uses compulsive defenses and some aggression (demanding) to handle her moderate anxieties

TABLE 169--Continued

Variable		Subject C-1-9
Intelligence Clinical Impression		borderline
Appearance	Pre	blond, nice-looking, good build
	Post	same
Attitudes	Pre	willing, friendly
	Post	same
Behavioral Observations Characteristics	Pre	accepted suggestions easily; some perseveration; timidity in hitting Bobo; very alert to adult approval
	Post	usual talkative self; engrossed in family play; hitched up trousers periodically in a way suggesting masturbatory equivalent
Play Activities	Pre	immediately changed the doll house "all around," had MD's office downstairs (like own MD's); stereotyped play; no humans and furniture fitted together as jig-saw; absorbed in joining farce
	Post	"straightened things up a bit;" no longer stereotyped; furniture arranged realistically; people present and house called "mine!" hit Bobo, pushing like most girls, from shoulder girdle; triggered
Motor Patterns Coordination	Pre	right handed
	Post	
Draw-a-Person	Pre	had a fine time but very distorted limbs; drew both boy and girl; girl's hair 2 times as long; boy had hat
	Post	
Orientation Memory Time Space	Pre	disoriented
	Post	
Despert Fables Phantasies Dreams and Wishes	Pre	
	Post	
Speech and Language	Pre	clear
	Post	
Parent Conference	Post	Mother attended: feels the teacher's trips invaluable; given him a perspective and helped with fear of new places and things; wonders whether he is just lazy; as a busy mother she has closed her eyes to the amount of play with sister; seems overwhelmed with 5 children
Parent Evaluation of Child	Post	"developed in lots of ways;" doesn't cry as often over new situations; prefers to play dolls with 3 year old sister than go out with 7 year old brother and play with other boys; sleeps better but is still a light sleeper; "trigger happy" sounded right to this mother
Summary and Comments		by history idiopathic epilepsy but not needing medication; while anxiety secondary to organic limitation is present, the emotional problems are intensified and have earmarkings of a developing character disorder; he withdraws from peer groups, regressively playing house, families, etc., with sister

At the outset, it is immediately apparent that the observational data obtained in the non-group setting of the playroom differs markedly in certain behavioral categories from that obtained in the classroom group situation. While it was generally true in the latter setting that behavior was hyperactive, unpredictable, and aggressive,it was generally untrue that these characteristics were seen in the playroom. However, other categories, such as impulsivity, poor self image, and visual perceptual problems were indeed demonstrated in both settings. This observation strengthens growing awareness on the part of psychiatrists that their diagnostic responsibilities when dealing with children must be broadened to include classroom observation and/or data on classroom behavior.

There are differences which are not yet understood in the psychiatric evaluation of those children who were previously enrolled in special education classes, as opposed to those who are new, which deserve highlighting here. Using a rating scale of one plus to three plus, clinical judgment was applied to the data to decide how much personality integration had occurred in nine months, as well as at the same time to determine the extent of the psychopathology of the individual child. While this is a manifestly rough rating, the clinical impressions appear to correlate with more objective data.

Improvement	Old	New
3+	8	3
2+	7	10
1+	4	7

Would the old students have taken bigger steps this year in any type of special school setting? Or was their personality more in readiness for this particular methodology? Does the fact that 10 (50 percent) new, opposed to 7 (37 percent) old children, appearing in the two plus category suggest that a project of this type can bring about personality integration at a faster rate, or is this a reflection of one kind of growth curve which is characterized by a sharp initial rise and a gradual leveling off? While there is wide variation in growth rates, nevertheless it is noteworthy that in all children there was social growth just as there was a measure of academic growth. Such was not the case in the areas of physical and emotional development where change was much less evident and more difficult to assess.

There was also a relation between parent attitudes toward, expectations for, and the evaluation of the child and his rate of emotional growth. Parents (13 known) who evidenced adjustment difficulties or frank neuroses had children who made the least progress in ego identification and integration object relationships and impulse control). Again, closer study may confirm the impression that some parents must see improvement effected in their child by, or through, others away from home, before they can modify their own attitudes and thereby accelerate their child's learning processes.

Another observation is that the clinical level of anxiety appears unrelated to the degree of achievement in learning (when the subjectively arrived at level of anxiety is compared with the educational achievement grade level gain. Such an observation is a worthy reminder that anxiety per se is only a symptom and must be understood as to origin. As the origin(s) becomes clear, one will have to determine the role of anxiety in the learning experience.

On the basis of the data made available by the current study, one may say that there appears to be no obvious correlation between particular attitudes or personality structures in teacher, child, or parent to explain the academic progress; for the gain in achievement levels among the four classes was not statistically significantly different.

In view of the widespread attitude among educators and psychiatrists that the child is too disturbed to learn until he has had the benefit of individual psychotherapy, it can be said from this project experience that certain children, at least, who needed (and need) psychotherapy have achieved academically without it and without observable personality insults. Thus, there is yet another reason for requiring more complete study and fuller diagnostic representation so as to keep the school door open to the child whom this type of study might show can use an available program after all, even as his name remains on a clinic or private treatment waiting list.

In summary, psychiatric evaluations offered evidence in all 40 children of visual perceptual distortion and deficits in ego organization, ego strength, and self concept. All of the children gained in social maturity. This latter statement is corroborated with the Vineland Social Maturity Scale Stanford-Binet scores. There is also corroboration with the Goodenough in the rough measurement of the developing ego, showing, if nothing else in some of the children, a willingness to commit themselves on post-test examination to the drawing of a human figure. The body image as reflected by drawings was grossly immature and sometimes bizarre. Sexual identification was often undetermined. The children appeared universally,but in varying degrees, unable to orient themselves in relation to time, space and/or other objects. Although difficult to score, play activities strongly suggested a preoccupation with fears of bodily hurt. Anxiety over lack of control in the expression of instinctual drives was consistently demonstrated, as were strong dependency needs. The latter were sometimes expressed in the form of evasiveness and a non-committal attitude when asked by the examiner for wishes and dreams. It was as though they had too much at stake to entrust themselves to a stranger. The major defense patterns which had been developed to handle the generated anxiety, frustrations, fears, and resentment included: 1) obsessive compulsive behavior, 2) denial, and 3) projection. The obsessive compulsive defense was the one most frequently utilized alone or in combination with the other defense patterns. Although children resorted on occasion to symbolic language (primary process thinking), the over-all attitude of all 40 children was one of willingness to belong to the human race.

To what might one look to understand the emotional gains? Experience has shown that these children need: 1) one or more adults on whom they can depend, 2) firm environmental control of their impulsive activity, 3) a minimum of daily stress (where change of activity _per se_ is one kind of stress), 4) the reinforcement of personality gaps by use of other personalities (teacher, peers), and lastly, the particular trait considered helpful to these children, 5) the development or reinforcement, if possible, of obsessive compulsive patterns. It is felt that the project's teacher-group-classroom constellation met, to a significant degree, certain essential personality needs of the brain damaged child. Although these needs do not differ (with one important exception) in kind from the usual requirements for healthy development, they do seem to differ in degree.

In short, and put in a somewhat different way, it would appear that to the extent that classroom structuring and the specialized teaching material led to mastery of even one function, such as visual perceptual or motor skills, anxiety was lessened.

In conclusion, it cannot be stated too strongly that further study of over-all medical and educational data and their inter-relation is indicated, both for their educational implications and for their value to the diagnostic and therapeutic efforts of the psychiatric discipline.

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CHAPTER VII

IMPLICATIONS OF THE DEMONSTRATION-PILOT STUDY

A complex amount of data and information have thus far been presented in discussing the demonstration-pilot study devised to evaluate a method of educating hyperactive children with and without diagnosed brain injury. In considering the implications of the study it may be well first to summarize the essential elements of the project. Forty children were carefully screened by means of extensive medical and psychological diagnostic procedures, and these children were assigned to four groups of 10 children each. The diagnostic phase of the study was concerned with isolating children with or without specific brain injury who showed the common psychological traits which are often associated with central nervous system disorders, i.e., hyperactivity and distractibility, perseveration, figure-ground pathology, reversals, angulation problems, dissociation, and myriad of other related characteristics. Under the direction of skilled teachers these four groups of children, two experimental groups and two control groups, were studied intensively for 1 school year and were then re-evaluated 12 months after the close of the experimental year. Essentially the plan of education involved a modification by Cruickshank of the Strauss-Lehtinen concept of education for brain injured children. In this study the plan consisted of the recognition of four essential principles:

1. the reduction of environmental space,
2. the reduction of unessential visual and auditory environment stimuli,
3. the establishment of a highly structured daily program,
4. the increase of the stimulus value of the instructional materials themselves.

As has earlier been pointed out, research concerned with human beings, children specifically, which is carried out within the framework of a public school, i.e., a service agency, is essentially characterized by a great number of variables. It is obvious to the authors and to the reader that many of the variables surrounding this particular experiment were uncontrolled and indeed were often beyond the possibility of control. Such is not stated by way of apology, but by way of a reminder that it is often impossible to state in educational research that which specifically accounted for the results which are observed from a study. This is true in this demonstration-pilot study, not necessarily because of the demonstration or pilot nature of the project. To some degree uncontrolled variables existed because of the fact that this was an unusual study quantitatively exploring an educational concept for the first time with groups. However, the most significant variables which were uncontrolled involved:

1. possible different interpretations of the educational philosophy and method by the four research teachers;

2. personality variables within the teaching staff;
3. the degree to which teacher assistants varied in their skills and cooperation;
4. the degree to which parents were informed of the program and supplemented it with home attitudes or instruction;
5. the degree of effectiveness and uniformity of directions to the teachers on the part of the project director, the resident coordinator, the staff psychologist, and others;
6. the varying extent to which teachers made use of psychological and psychiatric consultation;
7. numerous other quite obvious and extremely important factors which normally occurred in spite of structure of the program in the course of any school day or week. For example, a factor which was not measured, but which is undoubtedly important involves the length of the instructional period for each child, i.e., variation in school attendance because of illness, religious holidays, and the time of starting the instructional program at the beginning of the school year.

Each of the factors which has been mentioned, individually or in concert, exerted important emphases on the study and its findings. The extent of these influences has not been measured, nor could they be adequately appraised in most instances. These uncontrolled variables, however, and their relative roles in the study must continuously be kept in mind as one evaluates the report and projects future research through which more definitive knowledge may be obtained.

In the beginning of the study two different types of educational settings were developed by the authors, i.e., the experimental classes, in which an attempt was made by the project director, teachers, and staff to effect all of the basic essentials of the method; and the control classes, wherein with small groups of children and a professionally prepared teacher, the teacher could implement the instructional program as she deemed appropriate and wherein no modifications of the environmental structure were made except as the teacher might herself direct. Insofar as achievement in learning is concerned, it has been demonstrated that the majority of all of the children in both types of settings made significant progress. In a considerable number of comparisons it will be recalled that there were no differences observed between the gains made by the children of the experimental and the control classes.

It should be pointed out, however, that wherever in the study statistically significant differences were obtained, the difference in gain was in favor of the children in the experimental classes, i.e., in those classes where environmental stimuli were kept to a minimum, where the children had the benefit of small spaces (cubicles), and where other important environmental and teaching essentials were continuously recognized. It is the opinion of the authors that while further evidence needs to be obtained, there is sufficient value gained by hyperactive children from the non-stimulating environment and structured program with all that these two factors entail to warrant continuation of this approach with children of the type included in the study. What were the gains noted in favor of the children in the experimental groups?

While all children made some gain in their ability to differential figure from background, a skill essential to practically any type of abstract learning, the children of the experimental classes made somewhat greater gains in this respect. Similarly, almost all of the children made some growth in social maturity, but those in the experimental classes demonstrated this growth in more pronounced ways. The results of the Bender-Gestalt test were not always remarkable insofar as statistically significant differences between the two types of classrooms were concerned. In those instances, however, where there were differences in some of the psychological characteristics measured by the Bender-Gestalt test the difference was again in the favor of the experimental class groups. It would appear from these and other data within the pilot study that the elements essential to the experimental classroom settings were statistically valuable in appraising the gains made by those 20 children.

In view of the fact that all of the children, both experimental and control, made great gains in school achievement, there still remains to be answered the question as to whether this was due 1) to the presence of a professionally prepared teacher, 2) to the instructional method, 3) to the nature of the highly stimulating teacher materials, 4) to the isolation of the child within the classroom, 5) to the reduction of environment stimuli which was effected to some degree in each of the four rooms, or 6) to a combination of any or all of these factors. It is to be observed that something positive happened to the majority of the 40 children both in terms of school learning and in terms of social and emotional adjustment. Since these children had had a history of failure and regression in school achievement and social growth prior to the beginning of the study, it must be assumed that one or more of the factors inherent in the experimental design constituted the crucial motivational ingredient. It is the opinion of these authors that the elements which were controlled in the experimental classes provided a situation wherein greater positive conditioning could be experienced and wherein children who heretofore were distracted to the point of ineffectiveness were now more able to attend for a sufficient length of time to permit conditioning and to more fully achieve a success experience. The repetition of positive conditioning and the repetition of success experiences was sufficient to motivate the child and to ultimately permit him to function in social situations which contained a greater number of stimuli. The most important element which the children learned was to attend successfully to a given stimulus in the presence of a multiplicity of extraneous stimuli. While primitive, this single learned skill is probably the most important element in all of social growth and development in human beings. In the present study, as

As children learned to attend, growth in numerous areas was noted, ~~i.e.,~~ in number concepts, in reading, in social and emotional behavior, and in an understanding of a positive self-concept.

Study Implications

The remainder of this chapter is devoted to two major topics. The purpose of the first section is to discuss some of the major theoretical implications and significant by-products of the pilot study's diagnostic and clinical findings as reported by the staff. The final section is concerned with the study findings in terms of early identification of children with learning disabilities, the educational use of psychological and achievement test data in developing more adequate methods of grouping children such as have been discussed herein, and a discussion of the importance of the need for educators to understand the educational significance of developmental differences in children in planning over-all school programs.

Implications

Implications from Psychiatry

The authors are strongly predisposed in favor of the assumption that learning and behavior disorders result from, or are associated with, individual differences or dysfunction in the neurophysiological processes of growth, development, and maturation even in the absence of tissue damage. This assumption does not necessarily suggest a viewpoint concerning personality development which is in conflict with psychiatric theories of personality dynamics. Rather it suggests that psychiatric concepts are viewed as having a neurophysiological counterpart in the processes and dynamics of body growth and conditioning.

Gerard has stated that:

> . . . we all agree today that brain and mind are related. . . but the implications of this are often overlooked. A vital force does not move a molecule and an emotion does not discharge a neurone. When experience leaves an enduring trace, it must be some sort of material imprint; and, so to speak, there can be no twisted thought without a twisted molecule. Perhaps the simplest generalization to keep in mind is that all behavior in the external world, as well as all awareness of it, depends explicitly on the discharges of neurones. Certain neurones are fired by a given sensory input, these activate others, and still others, and in time certain final neurones activate particular muscles to contract or glands to secrete. Clearly, the properties of neurol units and of their relations are crucial to all normal and disturbed behavior. . . (1, p. 82).

Whether one agrees or disagrees in fact or in theory with Gerard, one should not rule out the possibility that a "twisted thought" may or may not involve a "twisted molecule," but that the "twist" in one or both of them may be in response to a disturbance in one or more of the sensory motor processes by which a given human organism selects, translates, and integrates life experience into a behavioral response patterns. Such, it was seen, was a significant characteristic of the hyperactive children included in this pilot study. Thus, the psychiatrist who views a symptomatic behavioral response pattern from the standpoint of his discipline as being the result of disturbed parent-child relations, may appropriately interpret reading disability "as a specific symptomatic manifestation of a disorder in ego function - the inhibition of learning and intelligence" (2, p. 299). He may then assume that the resolution of the reading disability is dependent upon the resolution of

> . . . a constellation of factors, conscious and unconscious, particularly conflicts around curiosity and aggression involving oral and anal ambivalence. . . Occasionally other problems such as prematurity, speech defects variations of visual acuity, and handedness problems may be further handicapping factors - other sources of frustration. These physical and developmental factors, then, while they do not appear crucial in the origin of the reading problem, may be contributory. There may be some possibility that the reading disability child may more frequently have an irregular constitution and physical background which might influence his subsequent psychic maturation and structure (2, p. 299).

In this reference to physical and developmental factors which might be contributory to the origin of the learning problem, one finds recognition of the possibility which Gerard points up, that there can be no "twisted thought" without a "twisted molecule." The question one must ask at this point is whether or not it makes any difference to the educator as to which assumption is uppermost in the minds of individuals engaged in research projects conducted within the framework of the public school. The point of view herein subscribed to is one which assumes that the viewpoint does matter and that the psychiatric frame of reference and treatment practices and goals generally are not compatible with nor appropriate to public school policies, procedures, and group instructional programs. This statement is made for the following reasons.

Briefly, it can be said that the pediatric psychiatrist works with children in terms of the psychopathology of personality dynamics. The success of the treatment is gauged in relation to the degree to which interpersonal problems are resolved within the therapeutic relationship. The treatment goal is to free the child's total energy output of the restrictions of anxiety and fear. Whether the treatment program is one involving group therapy or individual therapy, the energies of the child and the therapist are directed to the resolution of the psychopathology.

In contrast to this approach, the teacher works with children in terms of enlisting the support of the ego in acquiring mastery of the learning skills. The existence and resolution of psychopathological aspects of the personality is secondary to the instructional goal, and the success of the teaching situation is gauged in relation to the degree to which children achieve academic progress. In this frame of reference, the success of the child is evaluated in terms of his academic achievement as compared to that of his classmates. His relationship with the teacher generally is of less importance than his relationship with his peers.

Frequently one observes the results of attempting to superimpose a treatment-centered psychiatric frame of reference upon a teaching-centered classroom situation in "classes" for the emotionally disturbed children. The results of this practice have been dealt with in an earlier portion of this monograph and it is sufficient at this time to simply point out that the existence of gross behavioral disturbances is hardly sufficient justification for grouping children together with an instructional frame of reference. There may be even less justification in expecting individuals whose professional training and experience have taught them to be good group teachers, to utilize treatment procedures compatible with a one-to-one psychiatric setting, within a public school system where the policies, procedures and instructional goals have been established in order to transmit knowledge and academic skills in a group setting. These considerations must be uppermost also in the minds of administrators planning educational programs for hyperactive and brain injured children.

The adherence to a philosophy of the importance of the one-to-one relationship may partially account for one of the main communication problems posed by the psychiatric discipline to any other discipline. Gerard, to whom previous reference has been made, states:

> I am satisfied that the greatest barrier to rapid advance in psychiatric research today is the continuous and anecdotal character of the descriptive material on which psychiatric insights and generalizations are almost exclusively based. When more useful categories have been recognized and at least ordinal scales established; when it is possible to group (italics ours) the phenomena into classes and categories in a meaningful manner, rapid progress is certain to follow (1, pp. 85-86).

Justification for Gerard's comment was apparent in this pilot study where one of the important findings of the diagnostic staff was the similarity in the pattern of individual differences which the project children demonstrated in the diagnostic and clinical findings of each discipline. There was no doubt from the staff point of view that had it been possible to subject the psychiatric data to the same type of comparative analysis as the examination reports of the other disciplines were subjected to, the results would have been particularly revealing. All that was possible was to chart the material from the psychiatric interviews in an orderly, uniform sequence of diagnostic impressions. At best, it was only possible to report the pre- and post-test observations of the research psychiatrist on an individual basis. This ruled out any possibility of comparing the emotional growth of any given child, or children, with any other child or children in any form other than the psychiatric impressions.

It is apparent, however, that when extreme care is exerted in the grouping of children on the basis of their subtile nuances of psychopathology, they make progress in a purely educational setting. With hyperactive and brain injured children the school must understand its role. Its role is education, not psychotherapy. However, with attention to grouping and with an educational program conceived within the concepts of this monograph, not only educational achievements may result, but also social and emotional development of a therapeutic nature may concomitantly be observed.

In summary then, the assumption which underlies the writing of this section is that learning and emotional disorders in hyperactive and brain injured children result from the impact of stress (within the context and meaning of Seyle [3]) upon the neurophysiological systems and processes of the human organism. The point of view is one that while recognizing the value and importance of psychiatric concepts and treatment procedures for the discipline of psychiatry, regards them as inappropriate when superimposed upon a teaching situation since the continuing one-to-one psychotherapeutic treatment approach is not indefinitely compatible with the educational goals of group teaching. Of value to the field of education, however, would be the translation and reformulation of psychiatric insights and generalizations concerning personality dynamics into an instructional frame of reference.

In the pilot study an effort was made in an educational setting to utilize logically both the one-to-one treatment approach and the group educational approach with hyperactive and brain injured children. Beginning with the small cubicles and semi-isolation of children one from the other, the teacher was obligated to work on a one-to-one basis with each child. She attempted to create a secure learning environment in which the children would be able through successful conditioning to move, first, into very small group activities within the limits of the self-contained classroom, and ultimately into the highly complex group experiences of a regular or special grade group. Initially, the one-to-one psychiatric approach was used extensively by the experimental group teachers with each child working within his cubicle, within his ability level, and within the limits of his attention span. Out of this teaching situation, success gradually took place, appropriate self-concepts began to develop, tolerance of unessential environmental stimuli was gained, and the basis of small group activity

was achieved by the child. The initial utilization of the psychiatric approach, however, was completely educational and for educational gains. As this was achieved, group participation and instruction was substituted as rapidly as possible, but always the size of the group and the length of the group participation was within the tolerance level of the child.

The staff psychiatrist's impressions provide considerable supportive data for the above viewpoint and related observations. This report includes a summary of the results of the diagnostic evaluation of the 40 children participating in the project. The evaluations have been previously presented in an earlier chapter and were based upon the results of initial interviews with the children and their parents in a playroom setting. The report also includes clinical impressions based upon classroom observation by the psychiatrist of the children and a follow-up interview with the parents and children. Included in this section is mention of problem areas delineated by the pilot study which are, in the authors' opinions, in need of further investigation and exploration.

Here one cannot help but comment on the uniformity of the clinical impressions the examining psychiatrist found in the children referred to her. In the 40 cases there was evidence in 36 children of visual perceptual distortion and visual motor problems, while in all the children there were deficits in ego organization, ego strength, and self-concept. Body images, as reflected by drawings of the human figure, were grossly immature and sometimes bizarre. Sexual identification

was undetermined. The children appeared universally, although in varying degrees, to be unable to orient themselves in relation to time, space, and/or other objects. Play activities suggested a preoccupation with fears of bodily hurt. In connection with this comment, it should be noted that this fear was reality-based. Because of their many visuo-motor problems, the children ran into things and fell down more frequently than children without such problems. Anxiety over lack of control in the expression of basic drives was consistently demonstrated, as were strong dependency needs. The latter were sometimes expressed in the form of evasiveness and by a noncommittal attitude when the examiner asked concerning dreams or wishes.

The major defense patterns which had been developed by the children to handle the generated anxiety, frustrations, fears, and resentments included 1) obsessive compulsive behavior, 2) denial, and 3) projection. The defense pattern most commonly observed was obsessive compulsive behavior alone, or in combination with the other indicated defense patterns.

In summary, although the children had many valid and complicated emotional and learning problems and resorted on occasion to symbolic language (primary process thinking), the over-all attitude of all 40 children was one of willingness to learn if someone could teach them how.

Within the limitations of the study which have been noted previously, it was still possible for the staff psychiatrist to arrive at a number of clinical impressions concerning the results of the use of the specialized grouping procedures and instructional program with the children.

1. It is the psychiatrist's clinical impression that there was evidence of social growth in all of the children, to the degree that there was an objectively measurable degree of academic progress. This statement is corroborated by the results of the achievement tests, Vineland Social Maturity Scale, and the draw-a-man test used both as a testing measurement by the psychologist and as a rough measurement of developing ego strength by the psychiatrist.

In connection with the use of the draw-a-man test as a measure of developing ego strength, the following remarks by Bender are particularly pertinent.

> It is to be recalled (she says) , that the body image is the most complete gestalt experience involving the integration of all sensory experience impinging on the organism; it is genetically determined and passes through maturational stages which in the child can be followed through the human drawing (4, p. 159).

It is the feeling of the authors that, until the self-concept is appropriately conceived by the hyperactive or brain injured child in terms of the standards of society, learning basic to positive social adjustment will not take place. In the present pilot study it was often observed that as the child's self-concept began to have greater structure and detail (through the draw-a-man test), achievement in number concepts, reading, and other abstract concepts began to be observed or could be predicted. The adequate formulation of the self-concept and the body image is an essential to readiness not only in hyperactive and brain injured children, but undoubtedly in all children.

There was, of course, wide variation in the rate of social growth and degree of personality integration experienced by the individual children. Although objective evidence from psychological tests does not at this time support the clinical impression, it appeared from a study of the pre- and post-psychiatric evaluations that a major proplrtion of these children who had no previous special education classroom experience prior to the project derived more profit from the experience than those who had had previous special education programming. In the absence of objective evidence supporting this impression, one can only speculate as to the possibility that the specialized instructional programming and grouping methods brought about personality integration at a faster rate than previously experienced in other types of educational settings. A second possibility is that this impression is a reflection of a growth curve which is characterized by a sharp initial rise, followed by a gradual leveling or plateau, a phenomenon which special education personnel frequently find to be the case.

2. One of the most thought-provoking results of the psychiatric pre- and post-evaluations was that there appeared to be a decrease in the amount of parental tension and anxiety associated with attitudes toward and expectation for their children.

One of the possibilities which suggests itself as an area for further inquiry is to explore the thought that some parents may need to see evidence of improvement (increased academic proficiency, for example) effected in their child outside the home before they are able to modify their own attitudes toward, and expectations for, their child.

3. Although, as one would anticipate from a psychiatric point of view, those children whose parents evidenced the most severe adjustment difficulties or frank neuroses, made the least progress in ego identification and personality integration (in terms of object relation and impulse control). On the basis of the data made available by this study, one may say that there appeared to be no obvious correlation between a particular attitude or personality structure in the parent, teacher, or child which limited or contributed to academic achievement. This clinical impression is substantiated by the fact that the increase in academic achievement was not statistically significantly different between the four groups.

To what might one look for an explanation of the emotional gains?

In the discipline of psychiatry, experience (5) has shown that these children need:

1. one or more adults on whom they can depend;
2. firm environmental control of their impulse activity;
3. a minimum of daily stress (change of activity _per se_ constituting one kind of stress);
4. the reinforcement of gaps in their personality development through the use of other personalities (teacher and peers, for example);

5. reinforcement, if possible, of the obsessive compulsive behavior patterns. The classroom environment and the total study philosophy provided well for each of these important factors.

Further, it is the opinion of the staff psychiatrist and the authors that the rigorous grouping and matching of the child in terms of their learning and emotional needs, and the structured classroom and predictable scheduling of activities combined with specialized instructional techniques utilizing all the sensory motor aspects of learning met, to a significant degree, essential personality needs as outlined above.

These remarks would not be complete if the authors left unsaid what the major implications of this study are, from their standpoint, for the discipline of psychiatry.

1. In view of the widespread attitude that the severely disturbed child is too disturbed to learn unless he has had the benefit of psychotherapy, it can be said from experience on this project that at least certain of these children who needed psychotherapy achieved academically and socially without it, and without observable personality insults. Thus, there is an additional reason for requiring more complete diagnostic studies with fuller interdisciplinary representation in order for the psychiatrist and educator to keep the school door open to the child whom this pilot study has demonstrated can profit from an instructional program geared to his instructional needs, even while his name remains on a clinic or private treatment waiting list.

2. In line with this thinking, another, and what may at first glance be a somewhat surprising observation, is that the clinical level of manifest anxiety appeared, from this study, to be unrelated to the rate and degree of increased academic achievement and learning.

Such an observation is a reminder that anxiety _per se_ is only a symptom and must be defined and understood as to its origin before its handicapping or contributing role in problem solving situations can be evaluated. Only then will one be able to determine, define, and predict the role of anxiety in the learning process of the hyperactive, or indeed, any other child.

3. Almost from the first meeting of the clinical and medical staff in the conferences devoted to reporting the results of the individual examinations, it was apparent that the observational data of the psychiatrist obtained in the playroom setting differed from those obtained in the classroom group situation. It was, for example, generally true in the latter setting that behavior was hyperactive, unpredictable, and aggressive.

It was, however, generally untrue that these behavioral characteristics were seen in the one-to-one relationship of the playroom setting. This observation may help to strengthen the growing awareness on the part of psychiatrists that, when dealing with children, diagnostic responsibilities should be broadened to include observation of the children in a classroom or group situation, rather than to confine behavioral evaluations to the playroom setting and to secondhand reports from family or teacher. Such is particularly true in considering the diagnostic appraisal of hyperactive or brain injured children which must precede educational placement and programming.

Implications from Clinical Psychology

The reader will recall that the children included in the pilot study were carefully evaluated by the staff clinical psychologist. The project children presented a very uniform picture on the psychological tests. As a matter of fact, after the first 10 children were seen, there was such a similarity in their responses to the tests that it was as though the same children were being examined over and over again. One should perhaps temper this statement somewhat by adding that 4 children who were included in the study with previous classifications of strephosymbolia (a specific reading disability described by Orton[6]) and who met all the behavioral and medical criteria of the research design, deviated from the general pattern of psychological test responses in that they showed very minor disturbances of the Gestalt function on the various perceptual tests. The remaining 36 children showed a characteristic psychological test pattern. For example, on the Stanford-Binet Intelligence Scale the children had difficulty with items requiring ability in visuo-motor functioning (copying a diamond, bead stringing, copying forms), verbal abstractions, and memory for sentences and digits. On the Bender-Gestalt Test they produced drawings showing rotations, distortion of the configuration, perseveration, and dissociation. On the Syracuse Visual

Figure-Background Test they showed disturbances in figure-ground relationships, such as reduced perceptual accuracy, distractibility by the background, and perseveration. Perceptual difficulties were also seen on the Coding and Block Design subtests from the Wechsler Intelligence Scale for Children. The drawing of a man showed very immature and poorly integrated body image, and the level of achievement was uniformly below age grade expectancy.

Quantitatively, growth occurred on numerous psychological and educational tests. The children's perceptual abilities improved, their social maturity increased, and academic achievement advanced at the rate of 2.19 grade levels over the two-year period.

The project teachers were unanimous in voicing their feeling that the children had also made substantial progress in many ways that could not be evaluated by the psychological instruments used in this study. Much of the improvement thus described could be considered under the heading of social development, or development of emotional maturity to which the staff psychiatrist has previously made reference. In contrast to the need for individual instruction at the beginning of the academic period, by the end of the first academic year the children were operating as an instructional group for varying periods of time. Qualitative growth of this type is a subtle and evasive thing when one attempts to describe it objectively, but it was very real to the teachers.

At the conclusion of the project there were no statistically significant differences between the four groups in terms of gross measurements of academic achievement and social growth. There were, however, a number of statistically significant differences in various subtest items involving figure-ground responses and the items of the Vineland Social Maturity Scale. These differences, while significant in all four groups, were greater among the children of the experimental classes than those of the control classes.

It is not possible, within the design of the pilot study, to say what caused these differences. The authors feel that the greater structure and reduction of stimulation in the experimental classes and the more rigid adherence to the specialized teaching methodology might have effected these differences. On the other hand, one can hardly discount, nor indeed measure, the effect of also having a full-time speech therapist available in the school which housed the two experimental groups. The speech therapist, independently of the project, was well versed in the specialized techniques required by children with language formulation problems and organic speech defects. That all of the children improved cannot be denied, and, although it is well known that maturation and normal growth processes often result in improvement, one cannot say specifically what the effect of the maturation factor combined with the specialized methodology actually has been, or in turn, what impact the specialized grouping and methodology had on the normal growth processes associated with maturation.

In isolation or in combination they served to habilitate the children of the pilot study to a marked extent.

One limitation which was felt keenly by the staff was the lack of projective test information. The initial choice of tests was to determine the presence of specific psychopathology regarding learning problems usually associated with organicity. Rorschach tests were administered during the diagnostic period, but the results have not been included in the present study because the response total per record was so small that the value of the Rorschach in providing a valid personality picture appeared extremely doubtful. The children tended to give one response for each of the ten cards, even with repeated urging, and most Rorschach authorities (7) consider this to be inadequate for a valid personality description. The lack of projective information resulted in the necessity of making inferences about the emotional and anxiety status of the children on the basis of limited observations by the psychologists and others, combined with the results of the psychiatric interview data and teacher reports.

There is a logical fallacy in assuming that tests which have been standardized on a normal population and which have a basic assumption of quantitative differences can be applied to children who have specific learning disabilities, and who thys differ qualitatively from the standardization population. For example, the basic assumption of the usual intelligence test is that children have either more or less intelligence, and that if all children were administered the test, and the results were plotted graphically, the resulting curve would closely approximate the normal distribution curve. Indeed, the use of normal distribution theory assumes a continuous variation in the variable being tested. However, children may differ not only in quantity but also in quality of intellectual functioning.

Strauss and his co-workers (8), and Cruickshank and his associates (9), for example have demonstrated very convincingly that brain injured children have characteristic intellectual processes that are qualitatively different from normal children. As an additional example, consider the child who has a language formulation problem. The assumption underlying the memory for sentences, or memory for digits subtest on the Stanford-Binet Scale is that the child with "more" intelligence will pass the item; the child with "less" intelligence will fail. The child with a language formulation problem, however, may completely fail the item because of an inability to organize auditory experiences in a meaningful manner, even though his intelligence may be of a relatively high degree. This fact can be inferred from his ability to handle quite complicated problems which do not involve auditory functions beyond his ability.

A second example of this type of problem is associated with test itmes involving vocabulary. It is generally assumed that when a word is given to a child, the child will respond in a way which may be scored as either known or unknown. No allowance is made for the child who may not have end organ damage in the auditory equipment, but who may have problems in the receptive processes in the central nervous system. Here, again, is a qualitative difference rather than quantitative.

Most clinical and school psychologists recognize problems of this type which result from qualitative differences in individual intellectual processes. Frequently an attempt is made to resolve this difficulty by pointing out that the test results indicate a minimum level of functioning, with the implication that the actual level may be much higher than the test results indicate.

Other writers (10) have pointed out that no intelligence test has yet been devised which takes into account all of the known intellectual factors that have been isolated in factor analysis studies. This fact alone should result in extreme caution in interpreting and evaluating the results achieved by the use of available testing instruments when considering hyperactive or brain injured children. Granting these limitations, however, it should be recognized that intelligence tests are of value (as was borne out in the present study) in predicting an individual child's ability or lack of it in relation to academic achievement. To use test results in attempting to predict anything outside of the academic situation, however, is a questionable practice with the children herein under consideration.

In the context of this discussion and the pilot study itself, another word of caution should be offered concerning the general limitations of test instruments. In the 1937 revision of the Stanford-Binet Intelligence Scale, all items which were identified in terms of test responses associated with sex differences were systematically discarded as being "relatively less fair to one sex than the other" (11, p. 216). In commenting on this fact, it has been stated:

> It is of course clear that the philosophy of test construction, tied as it is now to the criterion of school performance, reflects little sophistication in the realities of our culture as a whole, but even if one were willing to accept a limitation on the applicability of intelligence tests strictly to school use this would not justify the obliteration of sex differences . . . (11, p. 262).
>
> . . . .
>
> If the items on tests which differentiate between the sexes were not so systematically discarded, patterns would emerge from the intelligence test performance of normal children which we would say were characteristic of their respective sex roles. We would then have some standard against which to compare the test profiles of retarded boys and girls and thus perhaps obtain some idea whether we should look first at intellectual, emotional, or cultural aspects of the problem in search of a cause and therefore correction and prevention. However, the existing tests will not permit this, nor can they provide a test of any hypotheses our speculations might generate (11, p. 264).

It may well be that the boys in the present groups, in general, have a quite different rate of development (including intellectual development) than do girls. This fact may not be reflected by the type of intelligence tests and subtest items currently in use.

Additional problem areas in the use of existing test instruments include the fact that tests like the Stanford-Binet have been devised in order to give a general estimate of intellectual ability. In addition, however, the psychologist is able to make many inferences about learning processes and problems, but it should be kept in mind that these are inferences based on an instrument which was designed for a different purpose. Consider, for example, the problem of perseveration. The existence of perseveration in a child constitutes an important teaching and learning problem, and is therefore an important factor in grouping children for instructional purposes. Many times children who show a great amount of perseverative activity on a behavioral level in the classroom fail to demonstrate this same trait on psychological tests. If perseveration on abehavioral level is as important as it appeared to be in this study, then it may be that a test or tests need to be designed to identify the existence of perseveration on a behavioral level. The same may be said for hyperactivity, distractibility, and lack of impulse control. In the present study, a wide variety of tests were used which were designed to tap different types of sensory motor activities and to isolate and define specific learning problems.

The staff psychiatrist has previously commented on the psychiatric implications of the experience of mastery for the child with impaired ego strength. The impressions of the research psychologist, based on reports of teachers, neighbors, and interviews with the parents, support the psychiatric impression. This stems from the observation that the children's behavior changed dramatically after having been placed in a class situation where they experienced success from the very first day. Some children, for example, who had been the scourge of the neighborhood, who were considered unacceptable as playmates and companions for the other children of the area, and who had been candidates for permanent exclusion from school, were by the end of the study accepted as citizens of the community and the school. The therapeutic effect of the results of the experience of educational mastery and success in a controlled teaching situation, combined with specialized grouping procedures has meanings and implications for all who work with children who have learning and behavior problems, whether they are hyperactive or not. Such is not a substitute for psychiatric treatment. However, appropriate educational diagnosis, grouping, and programming can go far to meet the total life needs of these children.

In conclusion, a final comment should be made which places in question a growing trend on the part of clinical and school psychologists working within the framework of public school systems to recommend a neurological examination if a child shows a characteristic "organic" pattern of behavior on the psychological tests. It is the opinion of these authors that the "signs of organicity" should be interpreted, within the framework of the public schools, in terms of learning problems, rather than as indications of organicity _per se_. This observation is strengthened by the fact that most of the children in the present study demonstrated visuo-motor problems in varying degrees, many showed rotations, and other "signs" of organicity, yet there was little or no correlation between these so-called signs and evidence of organicity as defined by medical and neurological findings, including EEG interpretations.

From the strictly educational point of view, which was the orientation of the present pilot study, the neurological and electroencephalographic data were of least value of any received. It is of little educational consequence insofar as classroom teachers are concerned to know that the several cranial nerves are or are not functioning properly. Such information is significant for research and is basic to treatment programs in disciplines other than education. Much more important to educators, however, is the knowledge that the child is dissociating, perseverating, or in other ways functioning psychopathologically. Within the framework of the latter information curriculum, modifications can be effected, class placement can be made, and teaching materials can be prepared which will permit educators to teach to the apparent disabilities and to help to rectify the influence of these disabilities on the child's growth and adjustment. Such is not possible from traditional neurological reports. Educators, particularly those concerned with the education of children with central nervous system impairments, have too often utilized referral for neurological evaluation as an escape from the frustration of not knowing how to plan adequately for the child. It is of significantly more importance that a careful psychological description of the child's behavior, his thought processes, and his intellectual characteristics be obtained from which, it is herein being demonstrated, a realistic educational program for hyperactive children and those suspected of central nervous system damage can develop. Neurological diagnosis _per se_ can rarely be translated into a dynamic educational program; psychological diagnosis can.

Implications from Audiology and Speech Pathology

In summarizing the results of the speech and hearing examinations on the project children, two patterns of language and speech behavior were apparent:

1. there was clear evidence of a lack of communicative awareness of the alternating roles of speaker and listener in verbal interchange;
2. there was difficulty in the interpretation and comprehension of verbal stimuli, a characteristic frequently associated with the effects of organic damage upon learning and memory.

In addition to these two patterns, there were many cases where the onset of speech was markedly delayed, while in others the onset occurred at a reasonable time but progress was delayed or retarded. A few of the children talked in a compulsive fashion which was not so much an attempt at communication as self-expression. A number of the children demonstrated evidence of cluttered speech; others, severe dyslalia with additional evidence of poor auditory discrimination and memory. In general, the children's speech was characteristic of that of much younger children and included evidence of infantile perseveration, substitutions, omissions, reversals, and a wide variety of articulation problems. The difficulties of the children might easily pass unnoticed by the casual observer, since many of them functioned quite adequately in verbal interchange structured in a one-to-one situation, although it was quite apparent that they would be unable to handle the verbal demands of normal conversation.

Hearing examinations revealed evidence of end organ damage in only one child. Learning difficulties associated with problems of auditory comprehension and recall, however, were noticeable in at least 30 cases.

Learning to listen, to understand, and to talk are among the most complex tasks the developing hyperactive or brain injured child undertakes. This communicative development is so intimately related with all other aspects of growth and development that its status at any stage becomes an index of the level of intrasensory function and cerebral organization, particularly as they relate to memory and learning. Any serious interference with the emergence of the complex, intricate sensory neural and cortical mechanisms, from organic inadequacy, from environmental stress, or from sensory deprivation, is often reflected in the child's language, speech, and behavior pattern. It is not strange, therefore, that approximately 80 percent of the hyperactive, underachieving children of this study had language and speech problems.

An important aspect of the developmental concept of audition and language development is that hearing is fundamental in learning and adjustment. The auditory mechanism is devoted to the absorption of incoming information, encoding and decoding the information in highly complex neurophycho-physical activities. Through hearing, information is received which the child learns to relate to various events and meanings. What he perceives through audition becomes a part of him and, in terms of symbolic patterns, becomes a memory and a model. These models control the shifting phonetic events of his speaking, a feedback mechanism is set up, and the child is able to hear his own speech and compare it with what he hears others say. Thus, he learns to monitor himself. Once the hyperactive or brain injured child has learned to monitor himself, it becomes possible for him to refine the details of incoming and outgoing messages, to learn language, to react appropriately to different levels of reference, and to develop the verbal symbolic nuances characteristic of the highest degree of intellectual development.

Unfortunately, hearing, however defined, is a highly complex activity, employing a neurophysiological circuity that is not as yet fully described or understood. Moreover, the relationship of what is heard to what is understood, and of both these activities to what is expressed, is even less clear. Although most children develop language and speech and learn how to use verbal tools in the learning situation, many do not, and the resulting prevalence of language and speech disorders is extensive. It is particularly high in a group such as the children in this study who demonstrated evidence of impairment or delay in the development of the auditory feedback mechanism.

There may be many causal factors contributing to this delay. Some may be identified and analyzed in terms of difficulties in learning and memory. Dysfunction in this regard would profoundly affect auditory and linguistic processing, and is quite enough to account for the appearance of delayed speech, retarded speech, cluttering, and severe dyslalia. In a sense, the interrelated functions of hearing, language, and speech mature in terms of an intricately balanced system of reflexes. The processes of conditioning and inhibition which serve in keeping these reflexes balanced require several years for development and are not fully mature until a child is 6 or 7 years old. Many things, prenatal, parinatal, or postnatal, may delay, retard, or impede this development. Fundamental chemical processes are involved, and apparently even slight imbalances in this regard may seriously affect such a learning and behavioral component as the capacity to learn to pay attention. When this capacity is disturbed,a child may express himself but be unable to communicate because he is as yet unaware of the verbal interchange necessary for normal communicate behavior.

In conclusion, it should be emphasized that although this discussion has had to do with normal or aberrant development of the neuro sensory mechanisms and processes in hearing, speech systems, and language development, it is recognized that all other aspects of growth and development must maintain a reasonable balance, for when any aspect of the developmental balance is impaired, the intellectual tools of language and speech are apt to be profoundly affected.

The presence of a high incidence of speech and language problems in the population of this pilot study impresses on the authors the significance of extensive initial diagnostic data regarding the nature of hearing and language development in hyperactive or brain injured children who may be considered for educational placement. It is not sufficient to know that the child is or is not characterized by a hearing loss. It is important that the nature of the hearing loss be thoroughly understood in terms of perception, memory, reproduction of language, and related speech characteristics. In this connection it is essential that the audiologist, speech pathologist, and the psychologist communicate frequently with one another regarding each child, for the characteristics of hyperactivity and of organicity which are herein being considered are closely related to each of the three disciplines. Their interrelationship must be understood by the diagnosticians before adequate information regarding the nature of the child can be provided to the teacher and before considerations regarding curriculum modification, grouping, and development of teaching materials can be undertaken.

Implications from Visual Examinations

Although provision for opthalmological examinations and optometric evaluations were not a part of the routine diagnostic study, visual examinations of both types were provided on a referral basis at the request of the staff pediatrician, neurologist, and speech pathologist and audiologist. In addition, the optometrist worked closely with the four research teachers in coordinating the classroom instructional program with the visual training program in those cases where the project children were also his private patients.

The following summary combines the findings of the opthalmologists made available to the project staff on the incidence of eye defects and the optometrist's evaluation of visual functioning among the children referred for examination.

Visual problems associated with eye defects and determined by opthalmological examination were at a minimum, although 5 children with nystagmus or strabismus had had corrective surgery performed their post-operative adjustment was successful.

From an optometric point of view, visual perceptual disorders existed (as has been pointed out by the research psychologist and psychiatrist) in varying degrees in the majority of children. These disorders in visual functioning revealed themselves, for example, in the lack of eye-hand coordination, problems of fusion, rotations, and reversals. Alternating strabismus occurred under stress situations, such as required by sustained visual attention to desk work. Frequently, these disorders were associated with limitations in eye movements in diagonal directions which resulted in difficulty in reproducing forms requiring the execution of diagonal lines. In general, the capacity for binocular vision for the children seen at that time was characteristic of a much earlier developmental level.

In general, the motor development of these children in terms of hand dexterity and control of eye movements was very poor. The children were better with gross movements than with the fine movements required in visually centered near point work as, for example, in drawing a diamond, copying a spelling list, or tying shoelaces. The response to tasks requiring fine motor abilities indicated a lag in the maturation of the developmental skills necessary for a child to succeed at the complex task required of him in executing pencil and crayon activities and placed serious limitations on any task requiring hand dexterity.

One aspect of the examination results indicated a need for special attention in the classroom situation. It has been established (12) that visual discrimination and interpretation of visual material are hindered by inadequate control of eye movements. It is difficult, for example, for a child to really see a thing if his eyes cannot be quickly and economically centered on a given object. In the case of this group, the eye movements and control of visual centering were often poor, resulting in the child's need to turn the head and then the entire body toward an object rather than simply moving the eyes in the correct direction.

In conclusion, it was the authors' impression that most of the children had not yet learned the basic visual motor skills necessary for adequate visual functioning. There were many indications for possible improvement, although one would not expect them to completely overcome their difficulties even with the aid of the intensive visual training they received through the specialized teaching methodology because of the time lost due to their chronological ages. There was, however, a good possibility that vision, through perceptual and motor integration, could be developed to an average level of efficient functioning.

Implications from Achievement Test Data

Since achievement test findings and their educational implications are presented in detail in another section of this chapter, it is sufficient at this point to simply indicate that 33 children were non-readers, 37 failed to score on the arithmetic subtests, and 29 were unable to spell even the simplest words at the beginning of the teaching period. This is not surprising in view of the fact that perceptual deficiencies, defective visual recognition, inability to recall visual patterns, and short attention span, all create confusion and difficulties in learning to read, write, spell, and number concepts.

The Diagnostic Team

The implications thus far discussed are almost repetitive in stressing the importance of adequate pre-educational diagnostic study. From the point of view of an extensive research study, diagnosis is one thing; from the point of view of practical educational programs, it may be another. What, in the view of the authors, *constitutes adequate* diagnosis of hyperactive and brain injured children in terms of the service function of the public schools? Experience in the demonstration-pilot study gives some basis for response to this question.

It should be re-stated that in considering the education of hyperactive or brain injured children, educators are dealing with extremes in their professional field. The nature of the individual differences presented by these children are so great as to require extensive interdisciplinary diagnostic study as a minimum to the development of an adequate educational program for each child. With a recognition that financial costs are often excessive, it is still felt necessary that full diagnostic data be received by the schools from diagnosticians who are familiar with the needs of the school personnel. In the present study the majority, if not all of the children, would have been permanently excluded from the public school system on the basis of the severity of their learning and social adjustment problems if they had not been included in the pilot study groups. On the basis of their educational experience in the study, all of the children still living in the school district are retained in the public schools, many of them in regular grade placements in their neighborhood schools. This growth and development and child salvage is significant enough to warrant the expense which was involved in the diagnostic phase, i.e., the basis on which an appropriate educational program was conceived.

A minimal diagnostic program will certainly include the following disciplines: pediatrics, clinical psychology, audiology and speech pathology, and a thorough visual evaluation. The experience of the authors in the present study indicated that the nature of the pediatric point of view was such that a significant amount of psychiatric and neurological information was available. It was certainly sufficient to provide the educators with the basic data they required and was sufficient as a basis for a decision to recommend referral to neurology or psychiatry if desirable. A well-prepared pediatrician with an orientation to pediatric psychiatry is essential to the ultimate educational program. Sufficient has already been said to indicate the necessity of utilizing professionally adequate clinical psychology, audiological, and speech pathology personnel. In view of the fact that visuo-motor and audio-motor disabilities are so characteristic of hyperactive and brain injured children, extensive information regarding the nature of the auditory and visual sensory modalities is requisite to an adequate understanding of the child. Data from hearing, vision, and speech specialists can undoubtedly be integrated by psychological personnel into meaningful concepts for the educator who must implement the diagnostic findings. The personnel indicated thus far constitute minimum planning.

If it is at all possible, pediatric psychiatry should be represented on the diagnostic team. It is evident in the present group of children and their families that not only was the psychiatrist uniquely able to provide different types of insights to educational personnel as compared with other diagnosticians, but also that the availability of the psychiatrist as a consultant to teaching personnel resulted 1) in continuous acceptance by the teachers of the children in spite of emotional disturbances within the classroom, and 2) through psychotherapy, in support to parents. This latter is reflected immediately in improved understanding of the child by the parents and in improved growth and adjustment of the child himself. The children do present extremes in behavior. These extremes often violate all educational concepts of personal and classroom deportment, behavior, and group integration. It is essential that there be available to the teacher professional personnel from other disciplines who can assist the teacher to see behavior of hyperactive and brain injured children in its appropriate educational perspective and in terms of the individual growth and development of the child. The discipline of pediatric psychiatry has demonstrated that it can serve a major role in this connection.

In earlier paragraphs reference has been made to the limited contribution to educators of neurological data and EEG readings. If funds are unlimited, these data are, of course, meaningful. If funds are limited, however, the data received from these sources provide less assistance to the educational planning procedures than do others which have been mentioned. The availability of social service data, obstetrical and hospital birth records, and the reports of other medical specialities as needed are, of course, important in considering individual children. These data, however, are not considered to be so vital as to be included in what these authors consider to be minimal diagnostic services for hyperactive and brain injured children.

Educational Implications

There is probably no other aspect of instructional programming which so clearly reflects the changing trends and shifts in educational philosophy as do the factors considered important in grouping children for instructional purposes.

During the last 50 years, for example, the pendulum has swung from the practice of grouping children on the basis of chronological age, dependence on rote methods of group instruction, and an unchanging curriculum, to that period when recognition of the concept and importance of individual differences precipitated a welter of various types of progressive reforms dedicated to the importance of the individual child, individualized instruction, and the use of a bewildering array of motivational materials. In spite of the psychologists' cautions and warnings to the contrary, enthusiastic interest and wholesale acceptance of the results of psychological test instruments as infallible guides in assisting the teacher in developing the emotional and social growth of the whole child reached its height during this period.

In the first case, it appears that the educational philosophy was based on the assumption that all children of a given age learned the same things the same way at the same time, and those who didn't were not required by law to continue frustrating themselves and their teacher. Thus, the limitations of rote teaching remained undetected for many years.

In the second case, the basic assumption had shifted from a belief in the fundamental sameness of children to a concept of fundamental differences. During the last decade, there has been increasing evidence that the pendulum is again swinging, but to a point midway between the two concepts. That is, the development of grouping criteria, group teaching methods, and curriculums based on patterns or similarities in individual differences in the learning processes themselves. The current study illustrates this trend.

It would appear from a review of the current literature that experimental methods and techniques for grouping children in line with specialized instructional needs or individual differences have been most thoroughly explored and have been most rewarding in the following general areas: the physically handicapped (8), including the blind and partially seeing (13) and the deaf (14), the exceptionally gifted (15), the mentally retarded (11), and the brain injured (16).

More recently, one sees the same trend appearing in public school systems which are initiating various types of track programs and ability grouping.

Educational Significance of Intelligence Test Data

Within this frame of reference, the following comments concerning the possible uses of psychological test data in instructional grouping and programming can be seen as further refinements in implementing an already existing philosophy of the importance of grouping criteria based on patterns of individual differences rather than sameness insofar as hyperactive and brain injured children are concerned.

In order to concretize the preceding remarks, one of the four groups of children participating in the present pilot study will be presented in various grouping combinations, including the proposed educational use of standardized test results. The same group of children will be used in each example and will appear in order of their chronological age.

Example No. 1

Grouping by Chronological Age

Chronological Age	Expected Grade Assignment
6-11	Second
7- 8	Second
7- 8	Second
7-11	Third
8- 0	Third
8- 0	Third
8- 4	Third
8- 5	Third
8-10	Third
9- 7	Fourth

In Example No. 1, the grouping of the 10 hyperactive or brain injured children would have been made on the assumption that children of a given chronological age equate with specific grade levels and can be taught the same subjects the same way because they learn at the same rate of speed.

In reality, only 2 of the 10 children could read, spell or do arithmetic at all: 1 on the first grade level; the other, on the second. Presumably, the children would have continued to be assigned the same books, the same arithmetic problems and the same spelling list year after year until they dropped out of school.

The grouping noted in Example No. 2 was made on the assumption that teaching efficiency can be expected only if a classroom group represents no more than three instructional levels, and that the mental age of a child is more important than the intelligence quotient. In line with this comment,

Example No. 2

Grouping by Chronological Age, Intelligence Quotient, Mental Age and Achievement Test Scores

			Stanford Achievement Test, Form J								
Chronological Age	Intelligence Quotient	Mental Age	Paragraph Meaning	Word Meaning	Average Reading	Spelling	Arithmetic Reasoning	Arithmetic Computation	Average Arithmetic	Battery Mean
6-11	78	5- 5	0	0	0	0	0	0	0	0
7- 8	82	6- 4	0	0	0	0	0	0	0	0
7- 8	107	8- 2	2.2	2.6	2.4	3.4	0	2.1	1.1	2.1
7-11	73	5- 9	0	0	0	0	0	0	0	0
8- 0	69	5- 6	0	0	0	0	0	0	0	0
8- 0	68	5- 5	1.3	2.2	1.8	2.9	0	2.4	1.2	1.7
8- 4	106	8-10	0	0	0	0	0	0	0	0
8- 5	83	7- 0	0	0	0	0	0	0	0	0
8-10	70	6- 2	0	0	0	0	0	0	0	0
9- 7	85	8- 2	0	0	0	0	0	0	0	0

it is interesting to note that the child with the highest IQ (107) and the child with the lowest IQ (68) were the 2 children who had achieved a small degree of academic proficiency, the child with the 68 IQ having a mental age of 5-5 and the one with 107 IQ a mental age of 8-2. In terms of chronological age, there is a difference of 4 months.

In Example No 2, one sees the fallacy of assuming that chronological age can be equated with grade level expectancy, intelligence quotient, or mental age in terms of academic achievement.

The above grouping criteria, combined with the additional matching factors from the medical and clinical studies (see Chapter III) represents the available grouping criteria utilized in the project classes. Nowhere in this combination of factors was there any clue to the tremendous variation and range in the individual differences of each child in terms of his own variation in instructional levels and subject matter.

In attempting to work through this problem, the research staff tabulated the results of individual test responses on the Stanford-Binet Form L subtest items. The results of this tabulation are shown in Table 170 and reveal beyond any doubt why when using traditional principles the four classes of 10 children so carefully grouped for maximum teaching efficiency constituted the most difficult and time consuming instructional groups ever devised in the interest of developing better teaching methods for hyperactive children with special learning problems.

Viewed from the standpoint of chronological age,the age range represented is approximately 7 through 9. One might assume that matters would have been less compliecated if only eight-year-olds had been assigned to this group. One look at the intelligence quotients in the 5 eight-year-olds, however, shows the IQ range to be from 68 through 106. The most important piece of information derived from the tabulation of the subtest items is the total range in ability levels which this group represents, i.e., from the year 4 through the year 12. Almost of equal importance from an instructional standpoint are the

TABLE 170

SUBTEST SUMMARY OF THE STANFORD-BINET INTELLIGENCE TEST, FORM L

	Variable	Summary									
	Chronological age	9-7	8-10	8-5	8-4	8-0	8-0	7-11	7-8	7-8	6-11
	Intelligence quotient	85	70	83	106	68	69	73	107	82	78
	Mental age	8-2	6-2	7-0	8-10	5-5	5-6	5-9	8-2	6-4	5-5
Stanford Achievement Test, Form J	Paragraph meaning	0	0	0	0	1.3	0	0	2.2	0	0
	Word meaning	0	0	0	0	2.2	0	0	2.6	0	0
	Average reading	0	0	0	0	1.8	0	0	2.4	0	0
	Spelling	0	0	0	0	2.9	0	0	3.0	0	0
	Arithmetic reasoning	0	0	0	0	0.0	0	0	0.0	0	0
	Arithmetic computation	0	0	0	0	2.4	0	0	2.1	0	0
	Average arithmetic	0	0	0	0	1.2	0	0	1.1	0	0
	Battery mean	0	0	0	0	1.7	0	0	2.1	0	0
IV.			B			B	B				B
1	Picture vocabulary		+			+	+				+
2	Naming objects from memory		+			+	+				+
3	Picture completion: man		+			+	+				+
4	Pictorial identification		+			+	+				+
5	Discrimination of forms		+			+	+				+
6	Comprehension		+			+	+				+
IV.6								B			
1	Aesthetic comparison		+			+	+	+			+
2	Repeating four digits		+			+	+	+			0
3	Pictorial likenesses and differences		+			+	+	+			+
4	Materials		0			0	0	+			+
5	Three commissions		+			+	0	+			+
6	Opposite analogies		+			+	+	+			0
V.											
1	Picture completion: man		+			+	+	+			+
2	Paper folding, triangle		+			+	0	+			+
3	Definitions		+			+	+	+			+
4	Copying a square		0			0	+	+			+
5	Memory for sentences		+			0	+	0			0
6	Counting four objects		+			+	+	+			+
VI.				B	B				B	B	
1	Vocabulary		+	+	+	0	0	+	+	+	+
2	Copying a bead chain		0	+	+	+	0	0	+	+	0
3	Mutilated pictures		+	+	+	0	+	+	+	+	+
4	Number concepts		+	+	+	+	+	+	+	+	0
5	Pictorial likenesses and differences		0	+	+	+	+	+	+	+	+
6	Maze tracing		+	+	+	+	+	+	+	+	+
VII.						C		C			C

TABLE 170--Continued

Variable	Summary									
Chronological age	9-7	8-10	8-5	8-4	8-0	8-0	7-11	7-8	7-8	6-11
Intelligence quotient	85	70	83	106	68	69	73	107	82	78
Mental age	8-2	6-2	7-0	8-10	5-5	5-6	5-9	8-2	6-4	5-5
VII.					C		C			C
1 Picture absurdities		+	+	+		0		+	0	
2 Similarities		0	0	+		0		+	+	
3 Copying a diamond		0	0	+		0		0	0	
4 Comprehension		0	+	0		0		+	+	
5 Opposite analogies		0	0	+		0		+	+	
6 Repeating five digits		0	0	+		+		+	0	
VIII.	B					C			C	
1 Vocabulary	+	+	+	+				+		
2 Memory for stories	+	+	0	+				+		
3 Verbal absurdities	+	0	0	0				0		
4 Similarities	+	0	0	+				+		
5 Comprehension	+	0	0	0				+		
6 Memory for sentences	+	0	0	+				+		
IX.		C								
1 Paper cutting	0		+	+				+		
2 Verbal absurdities	0		0	0				0		
3 Memory for designs	0		+	+				0		
4 Rhymes	0		0	+				+		
5 Making change	0		0	+				0		
6 Repeating four digits reversed	0		0	0				0		
X.										
1 Vocabulary	+		0	+				0		
2 Picture absurdities II	0		+	+				0		
3 Reading and report	0		0	0				0		
4 Finding reasons	0		0	0				0		
5 Word naming	0		0	0				0		
6 Repeating six digits	0		0	0				+		
XI.	C		C					C		
1 Memory for designs				0						
2 Verbal absurdities				0						
3 Abstract words				0						
4 Memory for sentences				+						
5 Problem situation				0						
6 Similarities, three things				+						
XII.				C						

B = Basal age
C = Maximum passing level
+ = Pass item
0 = Fail item

individual patterns of pass and failure on the subtest items. One example will suffice. Study the pattern of test responses of the child, age 9-7 with an IQ of 85 and mental age of 8-2. The basal age is at the year VIII level; the ceiling is at the year XI level. The _scatter_, however, is most unusual. No items at year IX were passed, but vocabulary was passed at the year X level. Vocabulary is thus almost 2 years above the mental age.

Descriptively speaking, the individual and group patterns, when tabulated in the above fashion, illustrates the uneven developmental picture so characteristic of the hyperactive children participating in the project.

The Binet summary in Table 171 was prepared from the test results of the same children given at the termination of the project. The table points up the impact of the diagnostic grouping and specialized teaching approach upon the uneven developmental pattern, particularly from the standpoint of bringing up the group's basal age level to a maturational level commensurate with academic readiness. This observation is substantiated by the individual and group gains in achievement as measured by the Stanford Achievement Test Form J, the average gain being 2.1 years for this group with a range from 2 months through 2 years, 8 months.

Recognizing the fact that the children were, on the whole, 2 years older and making every allowance for this fact, one is still impressed with the growth pattern in terms of mental age gains demonstrated in Table 171. Certainly this

TABLE 171
SUBTEST SUMMARY OF THE STANFORD-BINET INTELLIGENCE TEST, FORM L

Variable		Summary									
Chronological age		11-9	10-11	10-4	10-2	10-1	9-11	9-10	10-0	9-10	8-11
Intelligence quotient		82	64	87	107	78	65	78	114	81	71
Mental age		9-8	7-0	9-0	10-10	7-10	6-5	7-8	11-5	8-0	6-4
Stanford Achievement Test, Form J	Paragraph meaning	2.5	2.5	2.5	2.4	3.2	1.6	2.4	5.0	2.3	1.3
	Word meaning	2.3	2.9	2.4	2.4	3.3	1.7	2.6	5.0	2.3	1.8
	Average reading	2.4	2.7	2.5	2.4	3.3	1.7	2.5	5.0	2.3	1.6
	Spelling	3.0	3.1	2.6	2.2	4.7	0	2.7	5.0	2.1	0
	Arithmetic reasoning	3.1	2.0	3.2	3.8	3.2	1.3	2.0	5.0	3.0	1.6
	Arithmetic computation	2.7	1.7	2.8	3.4	3.8	1.9	2.3	5.0	2.0	2.2
	Average arithmetic	2.9	1.9	3.0	3.6	3.5	1.6	2.2	5.0	2.5	1.9
	Battery mean -	2.7	2.4	2.7	2.8	3.6	1.3	2.4	5.0	2.3	1.4
VI.			B			B	B	B		B	B
1	Vocabulary		+			+	+	+		+	+
2	Copying a bead chain		+			+	+	+		+	+
3	Mutilated pictures		+			+	+	+		+	+
4	Number concepts		+			+	+	+		+	+
5	Pictorial likenesses and differences		+			+	+	+		+	+
6	Maze tracing		+			+	+	+		+	+
VII.											
1	Picture absurdities		+			0	+	+		+	+
2	Similarities		+			+	+	+		+	0
3	Copying a diamond		0			0	0	0		0	0
4	Comprehension		+			0	+	+		+	0
5	Opposite analogies		+			+	0	+		+	0
6	Repeating five digits		0			+	+	0		+	0
VIII.		B		B					B		
1	Vocabulary	+	+	+		0	0	+	+	0	0
2	Memory for stories	+	+	+		0	0	+	+	+	+
3	Verbal absurdities	+	0	+		+	+	+	+	+	0
4	Similarities	+	+	+		+	+	+	+	+	0
5	Comprehension	+	+	+		0	0	+	+	+	0
6	Memory for sentences	+	0	+		+	+	0	+	0	0
IX.			C		B		C			C	C
1	Paper cutting	0		+	+	0		+	+		
2	Verbal absurdities	+		+	+	0		0	+		
3	Memory for designs	0		0	+	0		0	0		
4	Rhymes	+		0	+	+		+	0		
5	Making change	+		+	+	+		0	+		
6	Repeating four digits reversed	0		0	+	+		0	+		
X.											

TABLE 171--Continued

Variable	Summary									
Chronological age	11-9	10-11	10-4	10-2	10-1	9-11	9-10	10-0	9-10	8-11
Intelligence quotient	82	64	87	107	78	65	78	114	81	71
Mental age	9-8	7-0	9-0	10-10	7-10	6-5	7-8	11-5	8-0	6-4
X.										
1 Vocabulary	+		+	+	0		+	+		
2 Picture absurdities II	+		+	+	+		+	0		
3 Reading and report	0		0	0	0		0	+		
4 Finding reasons	0		0	0	0		0	+		
5 Word naming	+		+	0	+		0	+		
6 Repeating six digits	+		0	0	0		0	0		
XI.			C		C		C			
1 Memory for designs	0			+				0		
2 Verbal absurdities	+			0				0		
3 Abstract words	0			+				0		
4 Memory for sentences	+			+				0		
5 Problem situation	+			0				+		
6 Similarities, three things	0			+				0		
XII.	C									
1 Vocabulary				0				+		
2 Verbal absurdities II				+				0		
3 Response to PicturesII				0				0		
4 Repeating five digits reversed				0				0		
5 Abstract words II				+				0		
6 Minkus completion				0				+		
XIII										
1 Plan of search				+				0		
2 Memory for words				0				0		
3 Paper cutting I				+				0		
4 Problems of fact				+				0		
5 Dissected sentences				0				0		
6 Copying a bead chain				+				+		
XIV.								C		
1 Vocabulary				0						
2 Induction				0						
3 Picture absurdities III				+						
4 Ingenuity				+						
5 Orientation: direction				0						
6 Abstract words II				0						
XV.				C						

B = Basal age
C = Maximum passing level
+ = Pass item
0 = Fail item

would tend to add support to the idea frequently advanced (11) that for purposes of instructional grouping, it would appear that mental age is a more reliable grouping device than either chronological age or intelligence quotient.

Although it was not possible within the duration of the project to incorporate the subtest response pattern into the matching and grouping criteria, the research staff were so intrigued with the possibilities of its future used that the original 40 children were regrouped, using the additional information. Onesugh hypothetical group is reproduced in Table 172.

The reader will note that the chronological age range is from 6-10 through 9-9, the mental age 7-0 through 8-10, and the IQ from 80 through 107, representing a tightening up in the use of traditional criteria. The range in achievement levels is from 0 to 3.3, with 4 of the children unable to score at all. This range, on the face of it, appears to be an impossible instructional situation. A glance at the group's subtest response pattern, however, shows that with the exception of 2 children who failed one item at the VIII year level, in all other cases their difficulties with test items began at the year VII. One might speculate, in such a case, as to whether the teacher of this group wouldn't be able to cut down on the amount of individual instruction and concentrate the major proportion of her time on group teaching. Since it was not possible, within the duration of this project, to test out the usefulness of the patterns of individual subtest responses to the Stanford-Binet Intelligence Scale in grouping the

TABLE 172

SUBTEST SUMMARY OF THE STANFORD-BINET INTELLIGENCE TEST, FORM L

	Variable	Summary									
	Chronological age	6-10	8-2	9-9	8-5	7-8	9-2	8-2	8-3	8-4	8-4
	Intelligence quotient	102	102	80	83	107	89	106	107	106	94
	Mental age	7-0	8-4	7-10	7-0	8-2	8-2	8-8	7-0	8-10	7-10
Stanford Achievement Test, Form J	Paragraph meaning	0	2.9	0	0	2.2	1.5	2.2	2.3	0	1.3
	Word meaning	0	4.6	0	0	2.6	0	1.9	2.0	0	1.7
	Average reading	0	3.8	0	0	2.4	.8	2.1	2.2	0	1.1
	Spelling	0	3.0	0	0	3.4	0	1.8	2.2	0	1.7
	Arithmetic reasoning	0	3.2	0	0	0	0	3.2	1.8	0	0
	Arithmetic computation	0	3.0	0	0	2.1	0	2.7	2.5	0	1.8
	Average arithmetic	0	3.1	0	0	1.1	0	2.9	2.2	0	0
	Battery mean	0	3.3	0	0	2.1	.3	2.4	2.2	0	1.5
V.		B	B								
1	Picture completion: man	+	+								
2	Paper folding, triangle	+	+								
3	Definitions	+	+								
4	Copying a square	+	+								
5	Memory for sentences	+	+								
6	Counting four objects	+	+								
VI.				B	B	B	B	B	B	B	B
1	Vocabulary	+	+	+	+	+	+	+	+	+	+
2	Copying a bead chain	0	0	+	+	+	+	+	+	+	+
3	Mutilated pictures	+	+	+	+	+	+	+	+	+	+
4	Number concepts	+	+	+	+	+	+	+	+	+	+
5	Pictorial likenesses and differences	+	+	+	+	+	+	+	+	+	+
6	Maze tracing	+	+	+	+	+	+	+	+	+	+
VII.											
1	Picture absurdities	+	+	+	+	+	+	+	+	+	+
2	Similarities	0	0	+	0	+	+	+	+	+	+
3	Copying a diamond	+	0	+	0	0	+	+	0	+	0
4	Comprehension	+	+	+	+	+	+	+	+	0	+
5	Opposite analogies	+	+	+	0	+	0	0	+	+	0
6	Repeating five digits	+	+	0	0	+	+	+	0	+	0
VIII.											

TABLE 172--Continued

Variable	Summary									
Chronological age	6-10	8-2	9-9	8-5	7-8	9-2	8-2	8-3	8-4	8-4
Intelligence quotient	102	102	80	83	107	89	106	107	106	94
Mental age	7-0	8-4	7-10	7-0	8-2	8-2	8-8	7-0	8-10	7-10
VIII.										
1 Vocabulary	+	+	+	+	+	0	+	+	+	+
2 Memory for stories	+	+	0	0	+	+	+	0	+	+
3 Verbal absurdities	0	0	+	0	0	+	+	+	0	0
4 Similarities	0	+	0	0	+	+	+	+	+	0
5 Comprehension	0	+	+	0	+	0	0	+	0	+
6 Memory for sentences	0	+	0	0	+	0	+	+	+	0
IX.										
1 Paper cutting	0	0	0	+	+	0	+	+	+	+
2 Verbal absurdities	0	0	0	0	0	0	0	+	0	0
3 Memory for designs	0	0	0	+	0	0	0	+	+	0
4 Rhymes	+	+	0	0	+	+	+	+	+	+
5 Making change	0	+	+	0	0	+	+	0	+	0
6 Repeating four digits reversed	+	0	0	0	0	+	0	0	0	0
X.										
1 Vocabulary	0	0	+	0	0	0	0	+	+	+
2 Picture absurdities II	+	+	+	+	0	+	+	+	+	+
3 Reading and report	0	0	0	0	0	0	0	0	0	0
4 Finding reasons	0	+	0	0	0	0	0	0	0	0
5 Word naming	0	0	0	0	0	0	0	0	0	0
6 Repeating six digits	0	+	0	0	+	0	+	0	0	0
XI.	C		C	C	C					
1 Memory for designs		0				0	0	+	0	0
2 Verbal absurdities		0				0	0	0	0	0
3 Abstract words		0				0	0	0	0	0
4 Memory for sentences		+				0	+	0	+	0
5 Problem situation		0				0	0	+	0	0
6 Similarities, three things		0				+	0	0	+	+
XII.		C				C	C	C	C	C

B = Basal age
C = Maximum passing level
+ = Pass item
0 = Fail item

children for purposes of specialized instruction, one can only hope that others will find it a thought provoking idea.

In the preceding section, the discussion was mainly concerned with the general problem area of grouping criteria and speculation concerning the possible educational significance and use of standardized intelligence test data, illustrating this concept through the use of the Stanford-Binet Intelligence Test form and one group of the pilot study children. It is seen that with hyperactive and brain injured children one of the most significant problems to the educator is grouping. Children of this clinical classification present so many diverse problems and characteristics that time spent in careful grouping to achieve as much homogeneity as possible will be profitable in terms of effective teaching and child achievement.

In the following section, the authors will consider some of the educational problems pointed up by the results of the achievement test data in terms of all four groups of hyperactive and brain injured children.

Educational Significance of Achievement Test Data

The results and value of educational research, particularly when the project takes place in public school classrooms and involves the use of experimental teaching methods with underachieving, disturbed children, quite sensibly will be measured in terms of whether or not the children increased their achievement level. That is, did the children participating in the project learn better and advance faster under the teacher's use of the experimental methods than they had previously.

This section of the monograph reports the evidence of increased academic proficiency in terms of the total group of children participating in the four classes and considers some of the problem of using standardized achievement tests with this particular group of children. It will also highlight, in a few situations, the extreme need for cautious re-evaluation of some of the basic assumptions concerning the use of traditionally accepted indexes of the learning potential of children who do not achieve at grade level expectancy.

Academic Achievement Results, Stanford Achievement Test, Form J, October, 1957 - June, 1959

Thirty-nine of the 40 children participating in the four project classes remained in the research classes during the academic phase of the pilot study, September, 1957 - June, 1958. One child was excluded.[1] The Stanford Achievement Test was administered at the beginning and end of the school year. Two children made enough academic, social, and emotional improvement during this period to be transferred out of the project and assigned to regular class at their appropriate age grade expectancy level.[1]

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[1] One child was dropped from the study whose behavior disorders became so severe it was necessary to refer him for residential treatment for his own, his group, and his teacher's safety. Follow-up contracts revealed that his parents had been so eager to have their child in the study that the mother gave a false history of severe birth injury and traumatic pregnancy.

The diagnostic grouping and instructional aspects of the pilot study terminated at this point. The only formal connection with the project design being the continued use of some of the specialized equipment by 3 of the 4 teachers made possible by an additional grant for writing this report and providing for follow-up testing of the project children who remained in the Montgomery County school system.

Thirty-three of the original 40 children were still available at the time of the follow-up testing, June, 1959, and once again the Stanford Achievement Test was included in the test battery. The test results are reproduced in Table 173 in alphabetical order, since the diagnostic grouping of the children terminated at the end of the academic year 1957-58. The table is based on the test results of these 33 children.

As one can see from the above chart and as has been pointed out elsewhere in this monograph, during the pre-test period only 10 children were able to participate in the test at all, and 4 of these 10 made only partial scores. The IQ range represented by the 10 children who scored is from 68 to 107. Of the 4 children making partial scores, 1 had an IQ of 73, 2 of 89, and 1 of 91.

By the end of the instructional phase of the project (1 academic year), all 39 children, including the 33 identified

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[1] The formula for age grade expectancy is:

$$AGP = \frac{2 \times MA \times GP + CA \times GP}{3}$$

(Horn's formula for computing grade placement.)

TABLE 173

STANFORD ACHIEVEMENT TEST RESULTS

Subject	Pre-test October, 1957								Post- June,			
	Paragraph Meaning	Word Meaning	Average Reading	Spelling	Arithmetic Reasoning	Arithmetic Computation	Average Arithmetic	Battery Mean	Paragraph Meaning	Word Meaning	Average Reading	Spelling
C-2-7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5	2.1	1.8	1.5
E-1-4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	3.6	3.3	2.5
E-1-3	1.5	0.0	.8	1.4	0.0	1.5	0.0	.9	1.9	2.3	2.1	2.6
C-1-5	1.2	0.0	.6	1.7	0.0	2.5	1.2	1.1	1.9	2.1	2.0	2.9
E-1-1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.3	2.5	2.4	2.8
E-2-3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
E-2-9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.9	2.5	2.2	2.3
C-2-10	1.3	2.2	1.8	2.9	0.0	2.4	1.2	1.7	2.9	2.8	2.9	2.7
E-1-9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.3	2.5	2.4	3.3
E-2-4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	1.6	1.5	2.1
C-2-5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1
C-2-6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
C-2-2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.8	1.7	1.8	2.1
C-1-4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4
C-1-3	1.5	0.0	.8	0.0	0.0	0.0	0.0	.3	2.5	2.1	2.3	2.6
E-2-2	2.2	1.9	2.1	1.8	3.2	2.7	2.9	2.4	2.5	2.8	2.7	2.5
E-2-1	2.3	2.0	2.2	2.2	1.8	2.5	2.2	2.2	2.0	2.1	2.1	2.7
E-1-7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.8	2.1	1.9	2.6
C-2-9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
C-1-8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.7	1.8	1.7	1.6
E-1-5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.2	2.6	2.4	3.2
E-1-8	1.5	0.0	.8	1.1	0.0	0.0	0.0	.5	1.7	1.7	1.7	2.4
E-2-6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1
C-2-4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	1.8	1.9	1.4
E-1-10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
C-1-6	1.7	0.0	.9	2.8	0.0	1.4	0.0	1.2	2.5	2.5	2.5	2.8
E-2-8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
C-1-7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1
E-2-10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3
C-2-3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	2.1	2.1	2.1
C-2-8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	0.0	.6	1.8
C-1-10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
E-1-2	1.3	1.7	1.1	1.7	0.0	1.8	0.0	1.5	2.0	2.6	2.3	3.4
C-1-9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4	2.1	1.7	2.1
C-1-2	1.2	0.0	.6	1.2	0.0	2.1	1.0	.9	1.9	1.7	1.8	2.3

TABLE 173--Continued

test 1958				Follow-up June, 1959								
Arithmetic Reasoning	Arithmetic Computation	Average Arithmetic	Battery Mean	Paragraph Meaning	Word Meaning	Average Reading	Spelling	Arithmetic Reasoning	Arithmetic Computation	Average Arithmetic	Battery Mean	Grade Level Gain (1957-1959)
1.6	2.0	1.8	1.7	2.4	2.6	2.5	2.7	2.0	2.3	2.2	2.4	2.4
2.1	1.5	1.8	2.5	3.3	3.6	3.5	4.1	3.1	2.3	2.7	3.3	3.3
1.6	2.3	1.9	2.1	2.4	2.0	2.2	2.0	2.2	2.4	2.3	2.2	1.3
2.5	2.6	2.5	2.4	3.8	3.4	3.6	4.1	3.6	3.5	3.6	3.7	2.6
3.2	2.8	3.0	2.7	3.6	4.0	3.8	3.6	3.6	3.1	3.4	3.6	3.6
1.2	2.0	1.6	.6	1.3	1.5	1.4	-	2.8	1.9	2.4	1.5	1.5
1.5	1.3	1.4	1.9	3.4	3.0	3.2	3.1	1.6	-	.8	2.2	2.2
2.7	2.2	2.8	2.7	3.2	3.3	3.3	4.7	3.2	3.8	3.5	3.6	1.9
3.7	3.4	3.5	3.0	3.6	3.3	3.5	4.4	4.2	3.6	3.9	3.8	3.8
2.9	3.1	3.0	2.2	3.3	3.3	3.3	3.4	4.2	3.6	3.9	3.6	3.6
1.2	2.0	1.6	.9	2.3	2.3	2.3	2.1	3.0	2.0	2.5	2.3	2.3
1.0	1.2	1.1	.4	1.3	1.8	1.6	-	1.6	2.2	1.9	1.4	1.4
3.1	3.1	3.1	2.4	2.4	2.4	2.4	2.2	3.8	3.4	3.6	2.8	2.8
1.5	1.5	1.5	.9	1.5	1.9	1.7	-	2.4	2.1	2.2	1.6	1.6
3.4	3.8	3.6	2.9	3.3	2.9	3.1	3.1	4.8	4.1	4.5	3.6	3.3
3.4	3.1	3.3	2.9	5.8	4.8	5.3	3.8	4.8	3.7	4.3	4.6	2.2
2.9	3.2	3.1	2.6	3.3	3.5	3.4	3.0	4.8	3.6	4.2	3.6	1.4
1.8	1.5	1.6	2.0	2.5	2.6	2.6	2.7	2.4	2.4	2.4	2.5	2.5
1.5	1.9	1.7	.7	1.6	1.7	1.7	-	1.3	1.9	1.6	1.3	1.3
1.2	1.5	1.3	1.5	1.8	1.7	1.8	1.7	2.0	2.5	2.3	1.9	1.9
1.6	1.8	1.7	2.3	3.2	3.6	3.4	4.6	2.8	2.3	2.6	3.3	3.3
2.1	2.4	2.3	2.1	2.7	2.0	2.4	2.3	2.2	2.4	2.3	2.3	1.8
1.2	2.8	2.0	1.0	1.9	2.0	2.0	2.5	3.0	2.3	2.7	2.3	2.3
1.5	2.1	1.8	1.8	2.5	2.4	2.5	2.6	3.2	2.8	3.0	2.7	2.7
1.2	1.8	1.5	.6									
1.8	1.6	1.7	2.2	3.6	3.3	3.5	4.4	2.6	2.0	2.3	3.2	2.0
1.5	0.0	0.0	.3	0.0	0.0	0.0	0.0	1.0	1.4	1.2	.5	.5
1.3	1.2	1.2	.7	1.3	1.7	1.5	1.5	1.3	1.3	1.3	1.4	1.4
1.5	1.6	1.6	.9	2.1	2.0	2.1	2.1	1.6	2.1	1.9	2.0	2.0
2.7	2.4	2.6	2.3	2.5	2.3	2.4	3.0	3.1	2.7	2.9	2.7	2.7
1.2	1.2	1.2	1.1	2.5	2.9	2.7	3.1	2.0	1.7	1.9	2.4	2.4
1.0	0.0	.5	.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3.3	2.9	3.1	2.8	3.6	4.2	3.9	3.4	3.8	3.2	3.5	3.6	2.1
1.1	1.7	1.4	1.7	2.3	2.1	2.2	2.3	2.2	2.1	2.2	2.2	2.2
2.9	3.2	3.0	2.4	2.5	3.2	2.9	2.4	4.2	3.3	3.8	3.1	2.2

in the above chart, demonstrated in varying degrees increased academic achievement.

Two children, 1 in each of the two control groups, made sufficient progress to warrant regular grade placement. In connection with this statement, it should be reported that they were the 2 children whose level of achievement at the beginning of the project was the most advanced. One child was 7 years, 8 months of age, with an IQ of 107, and had a battery mean of 2.1 on the achievement test. The other child was 8 years, 2 months old, with an IQ of 102 and achieved a battery mean of 3.3 During the academic year following this test, the first child increased his academic proficiency to the point where he tested 4.0, a gain of 1.9 years. The second child made substantially less gain, a total of 7 months. This gain, was, however, all he needed to make in order to meet his age grade expectancy level. The functioning IQ in the case of the first child increased 7 points (107 to 114), an increase which is well within the 10-point variation recognized as an artifact of the test. The gain in the second case was 12 points (102 to 114), a substantial indication of the increased ability to function in terms of his intellectual potential.

In evaluating the impact of the use of diagnostic grouping and specialized teaching methodology upon specific learning disabilities in relation to specific subject areas, it is worth reporting that 23 of the 39 original children made greater increases in arithmetic the first year, while 15 made greater progress in reading. Only 1 child increased his achievement level in both subjects equally (from 0 to 1.8).

It is the opinion of the authors that the discrepancy in scoring on reading and arithmetic subtests of the Stanford Achievement Test reflected the general pattern of the uneven developmental pattern of the children. This observation would tend to be supported by the results of the follow-up testing of the children who remained available in the spring of 1959.

It is apparent in this case that the children not only continued to gain in achievement but, as indicated above, the gains were consolidated in terms of subject matter. That is, where the previous testing results demonstrated a substantial gain in terms of battery mean, all except 1 child were substantially more proficient in one subject than in another. This fact alone perpetuated the teachers' instructional problems referred to earlier in this chapter. The teacher, for example, when preparing her instructional materials and lesson plans, was required to prepare in all but one case material at two or more grade levels for each child. In the majority of cases, by the time the follow-up testing took place, this was no longer necessary; the children had consolidated their gains.

Table 174 summarizes the comparative gains of the children in terms of their age grade levels as determined by their Stanford Achievement Test scores for the three testing periods.

In the preceding section, the gains of the group have been noted. The following discussion is concerned with these gains in relation to some questions raised concerning the validity of using IQ scores and mental age in predicting the

TABLE 174

STANFORD ACHIEVEMENT TEST, FORM J

Pre-test, October, 1957
Total Number of Children Tested = 40

Achievement Levels: Grade Placement

Reading:	First grade	3 children
	Second grade	2 children
	Third grade	1 child
	Total Number of Children Scoring on Test	6
	TOTAL NUMBER OF CHILDREN WHO FAILED TO SCORE	34
Spelling:	First grade	7 children
	Second grade	2 children
	Third grade	2 children
	Total Number of Children Scoring on Test	11
	TOTAL NUMBER OF CHILDREN WHO FAILED TO SCORE	29
Arithmetic:	First grade	0 children
	Second grade	2 children
	Third grade	1 child
	Total Number of Children Scoring on Test	3
	TOTAL NUMBER OF CHILDREN WHO FAILED TO SCORE	37

Follow Up I, June, 1958
Total Number of Children Tested = 39

Achievement Levels:

Reading:	Readiness level	8 children
	First grade	9 children
	Second grade	12 children
	Third grade	1 child
	Fourth grade	2 children
	Total Number of Children Scoring on Test	32
	TOTAL NUMBER OF CHILDREN MAKING NO MEASURABLE GAIN	7
Spelling:	First grade	10 children
	Second grade	17 children
	Third grade	4 children
	Fourth grade	1 child
	Total Number of Children Scoring on Test	32
	TOTAL NUMBER OF CHILDREN MAKING NO MEASURABLE GAIN	7
Arithmetic:	First grade	24 children
	Second grade	5 children
	Third grade	10 children
	Total Number of Children Scoring on Test	39
	TOTAL NUMBER OF CHILDREN MAKING NO MEASURABLE GAIN	0

TABLE 174--Continued

Follow Up II, June, 1959

Total Number of Children Tested = 34

Achievement Levels: Grade Placement		
Reading:	First grade	6 children
	Second grade	13 children
	Third grade	12 children
	Fourth grade	0 children
	Fifth grade	1 child
Total Number of Children Scoring on Test		32
TOTAL NUMBER OF CHILDREN MAKING NO MEASURABLE GAIN		2
Spelling:	First grade	2 children
	Second grade	11 children
	Third grade	9 children
	Fourth grade	6 children
	Fifth grade	0 children
Total Number of Children Scoring on Test		28
TOTAL NUMBER OF CHILDREN MAKING NO MEASURABLE GAIN		6
Arithmetic:	Readiness level	1 child
	First grade	6 children
	Second grade	14 children
	Third grade	9 children
	Fourth grade	3 children
	Fifth grade	0 children
Total Number of Children Scoring on Test		33
TOTAL NUMBER OF CHILDREN MAKING NO MEASURABLE GAIN		1

achievement potential of hyperactive and brain injured children.

In order to illustrate the problem areas raised by the results of using standardized achievement tests with this group of children, Table 175 was prepared on the basis of test results on the children who participated in all three test situations. The reader will note that the information provided includes the mental age and intelligence quotients for all three periods, the 1959 Stanford Achievement Test individual battery mean achieved by each child, and a comparison between those means and the achievement status in relation to their mental age expectancies. Those cases where the actual achievement score equates with mental age grade expectancy are marked "average," those whose achievement scores are above their mental age grade expectancy are marked "high," and those whose score was below mental age expectancy are marked "low." The final figure demonstrates the total grade level gains from 1957 through 1959.

Table 175 indicates that 6 children made a grade level gain of 3 or more years, 16 a grade level gain of 2 or more years, 10 a gain of 1 or more years, 1 a gain of less than 1 year, and 1 child, who demonstrated a gain of .2 by the end of the first year, lost this gain following the termination of the project.

These gains should be examined in terms of some generally accepted assumptions. The comparison in Table 175 between the achievement test battery mean and the mental age is, for example, based on the assumption that age grade expectancy levels are derived from valid norms of mental age grade expectancy levels.

TABLE 175

STANFORD-BINET INTELLIGENCE TESTS, FORMS L AND M

Subject	Pre-test Form L		Follow Up I Form M		Follow Up II Form L		Battery Mean[a]	Grade Level Gain 1957-59
	MA	IQ	MA	IQ	MA	IQ		
C-2-7	5- 9	73	7- 4	83	7- 8	78	2.4 LA	2.4
E-1-4	5-10	84	5-10	74	6-10	76	3.3 H	3.3
E-1-3	6- 6	89	7- 0	82	8- 0	83	2.2 L	1.3
C-1-5	7- 0	82	7- 8	83	9- 8	94	3.7 L	2.6
E-1-1	7- 0	102	7- 0	88	8- 8	95	3.6 A	3.6
E-2-3	5-11	86	6- 6	83	7- 0	79	1.5 LA	1.5
E-2-9	5- 8	67	6- 6	69	6-10	65	2.2 H	2.2
C-2-10	5- 5	68	7- 0	78	7-10	78	3.6 H	1.9
E-1-9	5- 5	64	6- 4	68	7- 2	68	3.8 H	3.8
E-2-4	7-10	80	10- 0	95	10- 6	90	3.6 L	3.6
C-2-5	6- 4	82	8- 0	91	8- 0	81	2.3 L	2.3
C-2-6	5- 5	78	6- 0	77	6- 4	71	1.4 A	1.4
C-2-2	8-10	106	8-10	96	10-10	107	2.8 L	2.8
C-1-4	5-11	87	6- 6	82	6-10	77	1.6 LA	1.6
C-1-3	8- 2	89	9- 0	90	9- 6	86	3.6 L	3.3
E-2-2	8- 8	106	9-10	108	12- 0	118	4.6 L	2.2
E-2-1	8-10	107	9- 4	101	11- 2	108	3.6 L	1.4
E-1-7	5- 6	71	6- 6	74	6-10	69	2.5 H	2.5
C-2-9	5- 6	69	7- 0	79	6- 5	65	1.3 A	1.3
C-1-8	6- 8	71	6-10	66	7- 3	63	1.9 LA	1.9
E-1-5	6- 4	76	6- 6	71	7- 6	73	3.3 H	3.3
E-1-8	6- 8	73	7- 2	69	8- 2	72	2.3 L	1.8
E-2-6	6- 0	77	6- 4	73	6- 2	64	2.3 H	2.3
C-2-4	7- 0	83	8- 0	86	9- 0	87	2.7 L	2.7
E-1-10	4- 8	51	4- 9	48	----	---		
C-1-6	6- 3	76	7- 0	74	7- 2	68	3.2 H	2.0
E-2-8	5- 5	69	6- 0	68	6- 4	64	.5 L	.5
C-1-7	5- 6	72	6- 2	75	6-10	73	1.4 LA	1.4
E-2-10	5- 8	64	6- 4	69	7- 2	70	2.0 A	2.0
C-2-3	8- 2	85	7- 6	70	9- 8	82	2.7 L	2.7
C-2-8	6- 2	70	6- 4	64	7- 0	64	2.4 A	2.4
C-1-10	5- 0	61	5- 8	61	6- 2	60	0.0 L	0.0
E-1-2	7-10	94	9- 6	100	10- 4	98	3.6 L	2.1
C-1-9	6- 4	71	7- 4	73	8- 8	78	2.2 L	2.2
C-1-2	8- 0	91	7-10	81	10- 2	95	3.1 L	2.2

[a] Battery Mean, June, 1959. Comparison: Battery Mean - Mental Age.

H = High
A = Average
LA = Low Average
L = Low

Pre-test - October, 1957
Follow Up I - June, 1958
Follow Up II - June, 1959

Examination of the tabulated data in terms of the validity of this assumption reveals that 6 of the children would be considered overachieving, 6 achieving at grade level expectancy, and 23 somewhat below mental age grade expectancy. Of special interest, however, is the fact that of the 6 children, all of whom failed to score on the initial achievement test, who made the greatest allovergains in achievement and at approximately the same rate of speed over the two-year period, demonstrated an IQ range of 27 points (68 - 95).

The 1959 achievement test scores, mental ages and IQ's of this group of children are listed below.

Total Grade Level Gain	Achievement Score	MA	IQ
3.3	3.3	6-10	76
3.6	3.6	8- 8	95
3.8	3.8	7- 2	68
3.6	3.6	10- 6	90
3.3	3.6	9- 6	86
3.3	3.3	7- 6	73

Insofar as this group is concerned, one may raise a second question as to the validity and appropriateness of the assumption that IQ and mental age in relation to a given chronological age are necessarily predictive of an individual child's learning potential. For example, in the above group of 6 children, it was the child with the lowest IQ who made the greatest academic gain (IQ 68; total gain, 3 years and 8 months).

The most thought provoking problem area which this small sample of children outlined concerns the predictive value of using the results of standardized intelligence and achievement tests to classify children in terms of mental retardation. These traditional classifications, based on the IQ score, purport to define degrees of mental retardation. Within this frame of reference, for example, of the 22 children whose academic gain was 2 or more years over the two-year period, only 3 would have qualified as being of normal intelligence (IQ 96 - 118).

The intelligence quotients of the remaining 19 were as follows:

IQ	Number of Children
64 - 75	9
76 - 85	4
86 - 95	6
Total	19

Curiously enough, it appears, in this case, that the greatest number of potentially able learners had the lowest IQ's. It is also worth pointing out that the range in IQ in this group of 22 was 54 points (64 - 118).

One additional example will suffice to point out the extreme need for caution in assuming that deviations from population or IQ norms is an index of learning potential and a valid guide for classifying children for purposes of educational programming. Of the 6 children referred to earlier who, in spite of 3 previous years of total and complete academic failure, severe emotional problems and myriad specific learning disabilities, increased their academic standing 3 academic years over a two-year period, and would under such auspices have been classified as follows:

Number of Children	IQ	Classification
2	68 - 73	Mentally retarded
2	76 - 86	Slow learner
2	90 - 95	Borderline normal

In the following statement, one sees reflected not only the dilemma of the many hundreds of thousands of counterparts to the above 6 children who are assumed to be mentally retarded, but also a basic and sensitive recognition of the limitations of the test instruments by which the authors themselves appear to assume a child is retarded.

> In sum then, if we accept the fact that we cannot at present materially change the culturally determined standards of adequate performance, and that most intelligence tests will do little more for the retarded child than to confirm existing suspicions of inadequacy, we must turn our attention to determining which test or tests best differentiate among retarded children, between those who have more promise and those who have less, and in what directions the assets or liabilities of all of them lie (11, p. 262).

The Educational Implications of the Use of Achievement Test Data

The following general discussion is concerned with over-all educational practices and programs which lean heavily on the results of individual and group achievement test scores in classifying children for instructional purposes. Two such examples come to mind. First, the growing practice in public school systems of classifying children into track programs or ability levels and second, the so-called firming up of retainment policies in contrast to the practice of automatic promotion.

This statement does not mean that the authors favor automatic promotion over retainment policies; rather that track programs, retainment, and automatic promotion all share the same limitations as devices for educational programming because they do not make provision for recognizing or identifying the myriad causes of underachievement among children. One fourth-grade child, for example, who obtains a second grade achievement score in reading, may be underachieving because he has difficulty learning words. That is, he is unable to recognize or retain the visual image of the abstract forms out of which words are made. A second fourth-grade child of the same age and intelligence, with the same second grade reading score, may be able to remember word forms easily but lack the ability to associate words with their appropriate language concepts.

Under track programs the two children, since they are the same age and have the same IQ and test scores, would presumably be assigned to the same ability group and receive the same instruction, despite the fact that if they are to learn to read they need to be taught by entirely different instructional methods.

Under a retainment policy the two children would be retained in the fourth grade and would presumably repeat not only the same subject matter taught the same way, but quite possibly repeat the same failure on the achievement test.

Under the policy of automatic promotion, the existence of the children's specific learning disabilities as well as the difference in instructional needs, if they received any recognition at all, would be considered secondary to the emotional and social gains anticipated when children are grouped on the basis of compatibility of chronological age and opportunities for peer group identification.

One also suspects that in some cases adherence to a policy of automatic promotion grows out of the assumption that children underachieving at one grade level may, and sometimes do, catch up or outgrow their academic difficulties. One also occasionally hears the suggestion that automatic promotion fosters a generally accepted (although not acceptable) practice of teachers passing on their failing students and behavior problems to the next grade level in order to get rid of the child. It is, of course, only reasonable to assume that this practice does exist and, in some cases, is resorted to by some individuals because they are more interested in expediency than education. Experience with the teaching profession and personnel, however, would tend to suggest that in most cases teachers pass on such children when they honestly believe they have exhausted their own resources and consequently, in promoting the child, are acting in the child's best interest.

The above points have been made with the hope that they indicate the need for public school systems to exercise considerable administrative caution in subscribing sholeheartedly to a belief in the over-all instructional value of track programs to all children, or the helpfulness to all underachieving children of either retainment or automatic promotion.

It is hoped that no one will assume that the authors completely reject the value and usefulness of ability grouping, retainment and automatic promotion, or question the validity and importance of achievement and intelligence scores in grouping children for instructional purposes. What is actually being suggested is that in implementing such programs and policies, provisions should be made for identifying the causes of underachievement in order to avoid grouping together children who share the same level of ability but different instructional needs, such as the two fourth graders referred to earlier.

The Use of Achievement Test Data as an Aid in Detecting Learning Problems

In connection with the need for identifying the existence of specific learning disabilities among children, the research staff found that achievement test results can be useful guides to a child's difficulties, particularly when the test scores were plotted on the test profile according to the instructions given in the test manual.

Wide discrepancies, for example, between language and non-language scores, failure to discriminate between similarities and differences, and evidence of right-left confusion are, as most teachers are aware, general guides in identifying the strengths and weaknesses of a given child in terms of his potential for achievement when compared with the strengths, weaknesses and achievement level of classmates of the same chronological age.

What is much less widely known, even less well understood, and, although potentially of much greater significance to teachers, is that the subtest score profile of underachieving children, if properly understood, acts as clues to developmental differences and deviations. Descriptively speaking, one may say that the profile reflects the maturational levels of far more complex combinations and kinds of abilities than the ability to achieve.

In order to clarify this comment, imagine a third grade child in a test situation in which the teacher is administering a group achievement test. The test booklet, face up, is on the child's desk. The teacher can be expected to begin the test by reading the directions which have been standardized for that purpose. The directions are to be read aloud and may be as follows: "Look at the bottom of the booklet. It says - To Boys and Girls. This booklet has some games you will like. In taking the first part, you will show how many words you know and how well you can read. Do as many of them as you can. Do not turn this page until told to do so. No one is expected to finish all of the parts nor to do everything correctly. You may do very well even if you do not finish on time. If you do not know an answer, go on to the next question. You may come back to it later if you have time. Now open the booklet to the next page which has a big 1 near the top and fold it back so that the 1 shows."

The teacher, if she is following the directions for test administration given in the manual, will demonstrate the proper page in order to be sure that all her pupils have their booklets folded back to page 1. Once she is sure that the children have followed directions and helped those who didn't, she continues giving directions for the first subtest, which may be as follows: "Read the directions for this game silently while I read them aloud. They are: Below are some pictures of familiar objects. They are arranged in four rows. There are four pictures in each row. Now look at the first row and put an X on the object which begins with a T sound." At this point the teacher, if she is following the instructions for test administration, asks her pupils if they understand the directions, answers any questions and demonstrates how to make an X on the blackboard.

In summary, our third grade child participating in a group achievement test situation has been given a set of simple directions and asked to identify with an X the line drawing of a table. Now let us consider a few of the various associative and integrative processes involved in a satisfactory completion of the test and some of the basic assumptions made about the child if he is to follow the directions, identify the table, and mark it with an X. These comments are meant to illustrate, not define, some of the sensory motor processes involved in accomplishing certain tasks.

Task Number 1 - Following Directions

Since the teacher gave the directions verbally over a time span of at least 3 minutes and probably more, the following assumptions have been made:

1. There is no evidence of impaired hearing, or if there is, it has been identified and the results evaluated in relation to the classroom test situation and test results.

2. In the absence of impaired hearing, it has also been assumed that the developmental processes involved in auditory functioning have matured. That is, auditory perception, recognition and association, auditory discrimination, and recall have developed to the point necessary for the child to hear and understand verbal directions, remember them, and finally, auditory discrimination has developed to the point where the child recognizes the T sound as a separate auditory unit, is able to identify it as the initial sound (not consonant) of the name (not object) of a representational drawing of a table with which the test assumes the child is familiar.

3. The above developmental processes mature in normal children somewhere around 9 years of age. Under the circumstances, one would hope that the child is at least 9 and that all the developmental processes have matured evenly and at the same rate of speed. He would, for example, be helpless if he heard and understood the directions, but was unable to remember them.

4. It has been assumed that the child has no speech handicaps, nor difficulties in language formulation or, if he has, they have been identified and evaluated in terms of their effect upon the test results. That is, that the language formulation processes have developed sufficiently so that he is able to associate the words used in the teacher's language with their correct concepts in a meaningful, orderly sequence.

5. Finally, in order for the child to have heard and understood the directions, it has been assumed that he has an

attention span of 3 minutes or more, and that during that 3 minutes he has not been distracted from the listening task.

Task Numbers 2 and 3 - Identifying the Table and Marking it with an X

Since the objects in the test have been arranged in four vertical rows with four objects in each row and the teacher demonstrated how to make an X on the Blackborad, the following basic assumptions have been made concerning his eyes and the level of visual functioning.

1. There is no evidence of eye damage or impaired vision, or if there is, it has been identified and provision has been made for it in evaluating the test situation.

2. The developmental processes involved in visual functioning of the eyes have all matured sufficiently for the child to perceive the following things correctly: the four rows of four objects, each arranged vertically on the page and the vertical legs on the table; the oblique lines of the X drawn on the blackboard; and the square shape of the table top. If he perceives the first of the four rows correctly, the legs and top of the table, is able to maintain sustained visual attention and focus, has no visual motor problems involving eye-hand coordination, and not only perceives but is able to reproduce the oblique lines of an X shape, then this nine-year-old will be able to identify the table and mark it with an X at a much earlier chronological age than is normal. The above kinds of developmental processes involved in efficient visual functioning

of the eyes do not fully mature in children until they are approximately 12 years of age (12).

3. And finally, it is assumed that there is no evidence of damage or impairment to the brain and/or central nervous system or, if there is, it has been identified and its effect properly evaluated in relation to the test performance. In the absence of such damage, it has also been assumed that the integrative processes and associative systems of the body have matured sufficiently for the child to integrate the above auditory and perceptual experiences and relate them immediately to the motor skills appropriate to completing the task at hand.

In summary, if the child has heard, understood and remembered the directions given, perceived the object correctly, integrated these complicated sensory motor stimuli into the action of making an X on the table, he has followed the test directions and given the correct answer.

But what if he fails not only this test but so many others that his final achievement score is below his intellectual potential and grade level?

In view of the previous discussion, is it not reasonable to suggest that children who do not score at grade level expectancy be accorded at least the same professional attention that an expensive piece of delicately balanced machinery receives when it fails to perform efficiently the task for which it was designed? It would appear, at times, that the business world of men is much more concerned with causes of failure of their machines than educators are with the causes of failure in the business world of children.

The Educational Implications of Teacher Selection and Training for Hyperactive Children

In the previous section, the discussion was conducted with a minimal number of references to the project children. This appeared appropriate because the educational implications of the use of test instruments went far beyond this particular group of children. The following discussion concerning teacher selection and assignment is confined to teachers for hyperactive children.

One would like nothing better at this point than to be able to define and catalogue the specific factors and criteria by which teachers for classes of hyperactive children, comparable to the project groups, can be selected, trained and assigned to their classes with satisfaction guaranteed to both the teacher and children. This most certainly is not the case. All that can be offered are some very general guides which the project staff found helpful in selecting the four research teachers, all of whom demonstrated such a high degree of professional competence in their respective classrooms that one will never know just how much they contributed to the growth of the children.

Prior to specific discussion of these guides to selection, it may be helpful to state a basic philosophical concept shared by the project staff responsible for the selection of the teachers. This concept should be thoroughly understood in all its many implications and ramifications if one is to comprehend the depth of sincerity with which the staff concurs with the following statement.

> . . . Classroom conditions that challenge and satisfy one teacher can threaten and disorganize another. Recognition of a teacher's personal characteristics can . . . be utilized constructively through timely and skillful professional supervision that can support and help correct areas of insecurity as well as encourage and fortify strengths. Thus, the taking of teachers' personal make-up into account can significantly reduce job-connected anxieties. . . . This in turn can improve the classroom experience for both teachers and pupils . . . (17, p. 190).

When it is stated that the project staff would tend to avoid the assignment of teachers to groups of hyperactive children whose total professional experience is limited or confined to small groups, the staff is not saying these are not good teachers, only that they are not the best experienced teachers for this particular kind of group. Generally such teachers tend to find their best work done on a one-to-one basis and they find it difficult to move from this approach to the group approach. The teacher of the hyperactive and brain injured children must be able to perceive various types of grouping within a classroom and must be able to adjust to different approaches as the child progresses both academically and socially. Initially, much, if not all, of the teacher's work will be on a one-to-one basis. Here she must be able to give the child as much individual attention as he needs without causing the child to panic. As the child grows more secure in the one-to-one relationship with the teacher and is able to tolerate greater space and more stimulating situations, the teacher must be able to move with the child into small group instructional processes. A teacher of brain injured and hyperactive children must be one who can carefully, continuously, and successfully assess the progress of the child and who can modify the instructional climate to meet the child's newly achieved levels of behavior. It is essential that teachers not be used who identify with the pathology of the children and, on occasions, who utilize the instructional situation, consciously or unconsciously, to act out their own unresolved authority problems in power struggles with the children and/or their parents.

It would be the authors' impression that the teacher most comfortable and competent with this particular type of group is one who objectively loves teaching and enjoys the children. First and foremost, they should be professionally competent in the use of the skills, techniques, and tools of the teaching profession. Second, they should have several years experience in teaching, and possess the skills and controls essential in the management of an average sized elementary class of around 30 children. Their employment record should show that they have been rated by their supervisors and principals as consistently superior in their ability to provide group instruction and maintain an organized classroom environment the children enjoy. Preferably, they should have demonstrated exceptional ability in meeting the individual and group instructional needs of children in kindergarten, first, second, or third grades and, as a result, have a thorough knowledge and understanding of developmental sequence of the growth and maturation of the social, emotional, and educational abilities associated with the maturational process at each of the developmental levels.

Such teachers are usually professionally challenged, curious, and intrigued by the unresolved instructional problems of the times and, consequently, their attitude toward new and unfamiliar teaching concepts, instructional methods and techniques is characterized by elasticity, creativity and professional objectivity. They are more of an eclectic than a devotee of curriculum guides and methods, and are able to determine quickly the particular techniques and procedures to use at a specific time with a given youngster with a particular problem. Since the group they teach is easily distracted, has a short attention span, and lacks impulse control, it is important that their sense of time and skill in utilizing transition devices be developed to such a degree that the instructional day is experienced by the children as a smooth, flowing, many faceted continuum of learning.

Teachers of this calibre can be predicted to be good group teachers. That is, they use the individual or group structure as an instructional technique by which they communicate the skills which, in the end, make it possible for the children to learn how to proceed in completing assignments, independent of the group situation. Within this frame of reference, the teacher of hyperactive and brain injured children will be expected to be able to mobilize all her talent, experience, drive, and professional know-how in an effort to provide previously unsuccessful, disorganized, underachieving children with those skills which lead to successful learning experiences and help in promoting a sense of healthy well-being while participating in well-organized classroom activities.

And finally, once such a teacher is selected and assigned to her class, she should be expected, and expect, to teach and nothing else. The experience of children with a teacher of this calibre is described by Biber in the following words.

> She, the teacher, can lead him to become skilled, knowing, perceptive and effective in his world; to master confusions; to reorder experience through his own invention; to communicate in the modes of his culture and sustain the idiom of himself; to extend his "interest" world to far places and times; to act, to organize, to accomplish, to reason, to reflect. For this exciting and challenging task, there are special techniques and skill in using them that determines the extent to which the child's learning, achievement, the mastery become the framework for positive ego-growth, and contribute to the child's growing feeling as a knowing, doing, confident self in relation to a knowable, manageable world (18, p. 173).

It is the feeling of the authors that these ingredients of positive growth take on an added dimension of significance when they are the very ones which represent the greatest developmental deficits of the hyperactive child.

Educational Significance of the Diagnostic and Clinical Data for Over-all School Programming

In this chapter as well as those which precede it, a great deal of attention and time has been given to discussing the social, emotional, and educational needs of hyperactive and brain injured children. The results of medical and clinical study, combined with specialized grouping and teaching of a very small number of these children have been reported, tabulated, analyzed, compared, and the results subjected to intensive speculation. Attempts have been made, perhaps unwisely and with too much complacency, to explain the increased learning and emotional comfort of the project children in terms of the instructional and emotional needs of all children.

Many significant by-products of the project have been ignored; others, perhaps less significant in terms of the pilot study, have been reported in almost exhausting detail because of what appeared to be their over-all significance to educators and public school administrators.

In this concluding section, evidence is reported of what the research staff learned from each other and from the children, knowing full well that what is actually being offered may not be evidence of learning as much as evidence of a new set of professional biases. One can only hope that, in either case, professional support will be proffered where it is justified just as readily as criticism will be accepted by the research staff when it is justified.

Seen from this point of view, the project brought to the staff's attention what appears to be the results of an educational system which on the one hand subscribes to a philosophy which recognizes the existence and importance of individual differences among children and, on the other hand, had made little or no provision for identifying what the differences are or classifying them into meaningful patterns or developmental scales for instructional purposes. This dichotomy between philosophy and implementation is reflected in a number of ways:

1. One of the most serious results is the lack of routine procedures, personnel and facilities within the school system itself to identify the existence and causes of developmental deviations and individual differences.

2. In the absence of a reliable body of knowledge concerning the role of individual variations in learning processes and behavioral response; instructional programs, curriculum guides, and the results of psychological and achievement testing programs the country over are evaluated in terms of normative data derived from statistical rather than developmental studies.

The project psychologist, for example, has pointed out a number of the limitations in existing psychological test instruments which this practice has introduced. In line with his comments on the probable difference between normal rates of maturational development between boys and girls and the implications of removing test items considered unfair to boys, it should also be pointed out that our educational system, in general, makes no provision for this developmental difference. For example, curriculum guides, instructional manuals, and grouping children for instructional purposes all assume that all children of a given chronological age and intelligence quotient are not only ready to go to school at the same age but are also ready to learn to read at about the same time, regardless of their sex.

This assumption becomes even less tenable when one recalls that:

> . . . Sex is an important factor in determining birth size and the course of postnatal development. Newborn boys weigh about four per cent more than girls, and throughout later months of growth of bone and flesh, as well as oxygen consumption per unit of body surface, males are ahead of females. The difference becomes even more striking when we recall that, biologically, girls are older than boys of the same chronological age. At birth, this developmental difference is slight, girls being biologically only one month older than boys, but they are six months older at two, twelve months older at five, and eighteen months older at nine. Girls reach puberty at thirteen, fully two years ahead of boys (19, p. 172).

Keeping in mind the above statement of the biological age difference between boys and girls, and the diagnostic pattern of neurophysiological immaturity of the project children (37 of whom were boys), is it not time for educators to consider the very real possibility that current educational procedures may be _creating_ learning disabilities and emotional disorders among boys through the use of traditional grouping procedures and instructional programs which are not appropriate to sex-linked differences and developmental variations in the learning rate of boys. One only has to think of the approximate two-to-one ratio of boys to girls in reading disabilities, speech and hearing problems, deafness, blindness, and various types of emotional disorders to sharpen this suspicion into real concern. Further exploration of this possibility is urgently needed, if for no other purpose than to dispell it.

3. A third result of the dichotomy between educational philosophy recognizing the importance of the individual and the lack of procedural implementation of that philosophy, appears to be a direct result of the absence of concrete factual information defining the normality of individual differences in learning.

In the absence of such data, educators, as well as many other people, fail to dissociate learning and behavior problems from the child, giving rise to the common practice of classifying children with emotional and learning disorders as problem children, or at best, atypical children; the underlying assumption being that the difficulty is in the child or his parents.

In order to illustrate the point being made, one only needs to contrast this method of approach to the educational and emotional problems of children, with those developed in other disciplines with an established body of knowledge concerning the relationship between cause and effect. Contrast, for example, the difference between the medical term "childhood diseases" and the utter inappropriateness of such a term as "diseased children."

Would it not, at this point, appear reasonable to discard the practice of referring to "problem children" in favor of an all-out attempt to determine the clinical basis of underachievement and emotional disorders? The results of such inquiries would provide the discipline of education with the kind of information which would make it possible to classify various kinds of learning problems of children, rather than the children themselves.

The effectiveness of this approach is illustrated by the experience of the research staff of the pilot project. It will be recalled that a major proportion of the children in the research classes, prior to their selection as project participants, were classified as "problem children" and their failure to achieve academic mastery of the skill subjects explained away by still another semantic substitute for clinical data - they were "emotionally disturbed, underachieving problem children."

It was a refreshing and thought-provoking experience to see how quickly the use of these descriptive labels disappeared as the clinical basis for their underachievement and behavioral response pattern was established.

Thus it was that the earlier description of a composite profile of an underachieving, emotionally disturbed, problem child in Chapter III emerged from the diagnostic study as a hyperactive child with specific learning disorders, and was taught as such by his teacher.

The Role of Interdisciplinary Research and Pilot Studies in Public School Systems

Much has been written on the theoretical value of interdisciplinary research and its contributions to knowledge of human behavior. The following discussion is on a much more modest level.

From a practical standpoint, multidisciplinary research and pilot studies of public school problems are the quickest, most efficient, most orderly and, in the long run, least expensive method of attacking and resolving the problem areas of education.

This statement is made for the following reason. At no time in the history of this country's educational history and philosophy has the need for pooling up-to-date information on the causes of children's learning and emotional disorders been so great or so urgent. Neither have the results of not having such information available, including the educational implications, been so disastrous to professional morale and instructional efficiency.

One contributing factor to this situation is, of course, a lack of communication among those disciplines concerned with investigating the processes and deviations in human growth, development and maturation, and an even greater gap between those disciplines and education. When some method or means has been established for communicating and integrating new concepts among all disciplines, including educators working on an operational level, a major step will have been taken in providing the kind of information which will eventually make it possible to meet the educational needs of all children.

A second communication problem exists within the field of education itself. Outside of the educational journals and other forms of communication media, no organized system or channels are available on a nationwide basis to a clearing house where current educational problems and program needs of one school system are matched against available resources, pertinent data, and the past experience of other school systems. This results in costly mistakes being repeated over and over again because of not knowing "it's already been tried."

A third factor contributing to the lack of interdisciplinary communication is the resistance in all disciplines to the faces of social change. This resistance becomes particularly intensified and organized whenever a new discipline threatens to erupt within the ranks of older, more established disciplines. One only needs to recall the bitter war declared against barbers who became surgeons, against Pasteur "discovering germs," against doctors becoming psychiatrists, and currently, against the growing acceptance and importance of new concepts of treatment and diagnosis developing in those disciplines considered as ancillary to medicine.

The resolution of these very large, complex, interdisciplinary communication problems will take many, many years. Interdisciplinary research projects, however, provide a means of cutting directly through these difficulties, provided the personnel comprising the staff are carefully selected in line with the kind of criteria outlined earlier in the monograph. This statement in no way implies that there were no interdisciplinary communication problems in the project staff, but rather that it was possible to work through these difficulties for two reasons.

First, the various reports of each discipline were on the same children and were evaluated and interpreted in the immediate presence of the total group. In a sense, this meant that the "basic data" was identical for all members of the staff and on-the-spot provision was made for working through communication problems; and second, although the research problem meant different things to different disciplines, the solution to the problem and the educational aims and goals were of equal importance to all.

Another very practical aspect of utilizing this type of research project in public schools is that the pooling of up-to-date information on the educational implications of current research on growth, development and maturation processes takes place as the staff works together on a specific problem area with clearly defined limits and goals. Furthermore, since monographs or formal reports of some kind are required by almost every fund-dispensing agency, it is usually essential that the participating staff formulate and integrate the results of the project experience in such a way that it becomes readily available to others.

If one accepts the importance of the urgent need for intensive study of the role of human individual differences in the learning process, it becomes very clear that this study is not, and cannot become, the responsibility of any one discipline, but is the proper province of interdisciplinary research projects and pilot studies.

In conclusion, Mortimer J. Adler, while not referring directly to the problem as it is presented here, in making the following statements defines his own concern wisely and well.

> We need [he says], to reorganize and reorient our whole school system; to educate our teachers as few are now educated; to invent materials and techniques of teaching which do not now exist; and to devise graded courses of study which are designed to do for every level and kind of ability exactly what the traditional liberal curriculum once did effectively in Colonial times for the few and most gifted children (20).

Adler has stated what needs to be done if the United States is to cease being a country which "fails to honor knowledge." It is the authors' expressed hope that this monograph may suggest some methods for meeting that need.

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APPENDICES

Appendix A

Diagnostic Examination reports for children in Group C-1

PEDIATRIC HISTORY: C-2-1

The pediatric history was obtained by interviewing the mother while C-2-1 waited outside playing with blocks in the presence of his younger brother and the resident coordinator.

The mother is an attractive petite woman who seemed to be a little depressed and not too anxious to talk about C-2-1's problems, although she did volunteer information without too much difficulty. The general attitude nay have been due to the fact that she had gone through similar interviews innumerable times in the past.

Presenting Problem:

"He can't be quiet; he balks--gets too emotionally upset, especially with other people and mostly with strangers. When he is by himself he's fine, although he doesn't prefer to be by himself; he will seek out other people."

"It is difficult to complain now. He's better than he was last ear." "Can't get to him or reason with him. You don't feel like you're etting to him."

The mother became aware of her son's difficulties at the age of two ears when he began playing with other children. It was at this time that he noted that he would scream during the middle of the night as if he were ving nightmares. She had no way of knowing whether this was normal or bnormal since she had no other children and no basis of comparison. At pproximately one and a half years of age he started getting up at night nly once. She would pat him and put him back into his crib. At first his would suffice. Then it became necessary to repeat this two or three imes during the night. Although she would try picking him up it appears hat this was not what he wanted. When holding him didn't seem to do any ood, she would take him into bed with her, but that didn't seem to work ither. At such times when he would be found to be standing up in his crib nd would scream for long periods at a time. At first he would be spanked nd this didn't do any good. Then finally, in desperation, she would shut he door and let him cry it out, sometimes letting him cry for an hour and half before he would fall off to sleep. He had a room to himself since he age of five months. After consulting her pediatrician about this condition, he was given phenobarbital a half hour before bedtime. This worked or as long as he was taking the phenobarbital. However, whenever it was iscontinued, the same pattern was seen again. At about the same time it as noted that he didn't have much interest in or with other children. In heir presence he would make noise and throw sand and other things. The mother qualified this as "attention getting." She states that he still doesn't get along too well with children, although he is beginning to have friends. He prefers larger boys or boys of his own size rather than smaller children.

His activity consists in building forts or playing with blocks. He seems to be constantly running around. When he is by himself he will sit and play with blocks. However, when he is with others, he always has to be doing something. His mother states that he seems to have antagonized just about everyone, regardless of their age, although she notes improvement. When questioned about how his behavior was handled at first, the mother said that at first she tried reassuring him. When this failed, she tried spanking. However, nothing seemed to do any good. It appeared to her as if the child knew what was expected of him, or wanted of him, but paid no attention to this. Punishment was ineffectual because there seemed to be little he cared for, and so nothing seemed to matter that much to him. He did not seem to accept extra attention. He did not want to be held or loved.

Although the father was away a good part of the time, he did know what was going on and was well aware of the situation. It was his opinion that they were not strict enough with the boy. He undertook disciplinary measures, both on a positive and on a negative side. The mother said that farmers aren't as easy on children as mothers are. The father further looked on some of this behavior as negativism.

When C-2-1 was three years of age he underwent a T & A. It was following this operation that the nightmares stopped. He bagan sleeping better and eating better. It would appear that he was a poor eater as well, always having to be bribed or coerced into eating. However, the mother states that following the T & A, C-2-1's eating habits became better.

When asked what the reason for the T & A was, the mother said that C-2-1 had had repeated colds and sore throats. There was not any evidence of mouth breathing or snoring. He did have nose bleeds and was unable to blow his nose.

Family History:

1. His mother's mother living and well?
   Answer: Yes
2. His mother's father living and well?
   Answer: Yes
3. His father's mother living and well?
   Answer: Yes
4. His father's father living and well?
   Answer: Yes

5. Are all of mother's brothers and sisters living and well?
   Answer: Mother has one sister and four brothers all of whom are living and well.
6. Are all of father's brothers and sisters living and well?
   Answer: Father is an only child.

There is no family history of epilepsy, nervous breakdown, hospitalizations for mental illness, conculsions, heart disease, syphilis, tuberculosis, diabetes, or cancer. There is no history of co-sanguinity.

Family Background:

Father: Age 42 years. He is a nice person, not too social and prefers his family to other people. He is a complainer about things in general. He is not too easy going and fusses a great deal. He shows concern about the children's welfare, although he doesn't seem to get down to their level in play or in fantasy. His wife remarked that his parents were very strict with him, although he does respect his parents, adding "a lot more than other people do." He is a salesman. He completed high school and business school. When asked how he feels presently about his sons situation, the mother said that her husband feels that C-2-1 should be in his own school, instead of having to come to special classes at Rockville. He feels that he will pick up bad habits, etc., doing this.

Mother: Aged 39, she says she used to be even-tempered. However, she is now mean because of the tension about C-2-1 and feels that perhaps the fact the she is approaching forty years of age might have something to do with it. She completed high school and business college, and was employed as a secretary. She feels that C-2-1 is so much better than he was a year ago, and she states that she is willing to go along with whatever is necessary for his well-being. She expressed the desire that she would prefer that the boy behave himself whereas his father prefers for him to be able to learn. This is her second marriage, having been married for six years before without any children.

Siblings: A sister, age 5½ years, presently in kindergarten and in good health. Brother, two years of age, in good health. It would appear that C-2-1 behaves the same way toward his brother and sister as with others. He doesn't show any resentment of them and did not seem upset when they arrived on the scene. He shared his room with his sister until she reached the age of two, and now shares his room with his brother.

Mother's Medical History during pregnancy with child:

The pregnancy with C-2-1 was desired although it came somewhat as a urprise after being married for two years and trying to have a child. She was 30 years of age at the time and received pre-natal care during first months of the pregnancy. Just prior to conceiving, the mother had undergone surgery for the removal of an ovarian cyst. The delivery itself was not remarkable. There were no accidents during her pregnancy and she said she felt wonderful, having worked during the entire pregnancy up until the last month. Her diet was adequate and there was no physical or emotional strain, and she received no medication.

Labor and Delivery Factors:

Baby was born at a local hospital. Length of labor was 24 hours in the hospital. Baby was born with forceps scars on each side of the head. The bag of waters was ruptured artifically. C-2-1 was seen by his mother within the first six hours following his birth. He weighed six pounds, three ounces at birth, although he apparently lost so much weight that he couldn't be circumcised at the time he left the hospital. Even in the hospital it was noted that he kept crying. He didn't seem to eat well at all; he did not seem to be interested in food. The mother volunteered the information that perhaps he should have had special care and attention. He was placed on an evaporated milk formula and apparently settled down after the first month.

Past History of Diseases:

Immunization--DPT, no sequela, and he has had his Salk vaccinations. He had chicken pox at the age of six years. Apparently it was very severe. He had a fever for about a week and was confined to bed. He could not even swallow water, his mother says. Except for circumcision and the T & A, he has had no other operations.

Developmental History:

C-2-1 has always been a feeding problem. This became more apparent at the time that regular food was introduced at the age of one year. He had been given vitamin supplements adequately. He voluntarily gave up his bottle at th age of five months, and started drinking from a cup. He has difficulty tying his shoes although he is not clumsy; he is sure-footed and walks with a steady gait. He can build things and follows instructions very well. He achieved bladder control and bowel control at two years of age. When he is by himself his attention span is OK. He is able to button his own buttons, zip a zipper, and although he can not tie his shoes too well, he is able to. When he is being watched, however, he will not even try. At the end of our physical examination, when we asked him about tying his shoes, at first he ignored the remark and then said that this was something his mother would do.

Interests:

He likes to look at books, although he is not given any comic books. He likes tools or anything connected with building things. He can sit through cartoons at a movie and will watch certain programs on TV.

Personality:

In answer to the question as to how C-2-1 handles punishment, the mother said that at first he used not to react at all. Now he behaves as if an injustice were being done. He is belligerent or resentful and he talks back but doesn't sulk. He does not seem interested in fighting and will not fight at all, and he is not mean to young children. When he is frustrated he will talk back and bluster. He seems to like school now, although he didn't use to. He used to feel the teachers were mean to him.

Physical Examination: Blood pressure 90/60.

General appearance: C-2-1 is an alert, pleasant looking, hyperactive, and asthenic child. He did not seem particularly withdrawn or afraid of the doctor of the various procedures entailed in this examination. He recognized the various instruments and seemed to know what their function was. It seemed difficult for him to remain quiet and still, but as his confidence was won he became more cooperative.

He is tall and slender--his rib cage being prominently visible. He was not particularly pale and his state of hydration was good. There were no gross speech defects or impediments and he only occasionally blinked his eyes more frequently than is ordinarily seen. His posture was good and his gait normal.

Skin and Mucous Membranes: There were no skin eruptions, nor discolorations or other evidence of trauma. Lymph Nodes: There was no significant lymphadenopathy. Head: The head is of normal shape and position, being freely movable on the neck in all directions. The hair was cut closely and of normal consistency with no evidence of seborrhea or parasites. Face: There was voluntary facial control with no apparent asymmetry. The expression was hat of an alert youngster. Ears: The otological exam was not significant. Gross hearing was apparently normal. Mouth and Throat: C-2-1 did not breathe with his mouth open. His lips were of normal color with no evidence of any fissures or eruptions. His teeth were poorly aligned but in satisfactory condition, numbering 11 on the top and 10 on the bottom. The arch of the pal- te was normal. The tongue was normal looking and neither trembled nor devia- ed when protruded. The tonsils were absent. Neck: The neck was perfectly upple with no apparent masses or thyroid enlargement. The trachea appeared o be in the midline and there was no evidence of venous enlargement. Verte- ral: There were no abnormal curvatures of the spine, nor was motion limited r painful. No spasm or tenderness could be elicited. Chest: Rib cage was rominent but no abnormal masses were palpable. The chest was symmetrical as ere the respiratory excursions. The lungs were clear to percussion, palpa- ion. The heart did not appear to be enlarged. The P.M.I. was in the mid- lavicular line of the 5th interspace on the left and was quite forceful. here were no murmurs or trills. The radial pulses were not easily palpable ut were present as were the femoral pulses. Abdomen: The abdomen was sca- hoid in contour. There were no masses palpable, nor were the liver, spleen, r kidneys palpable. There wasn't any spasm or tenderness. Genitalia: The scrotum was well developed and both testicles were palpable therein. The enis was circumcized and there was no evidence of inguinal hernia. Anal region: Not remarkable. Extremities: There were no gross deformities; mil pes planus; good muscle tone and normal range of motion in all extremities. Neurological: The deep tendon reflexes were not easily elicitable, but the pateller reflex was hyperactive bilaterally. There was no clonus. The Babi ski reflex was not elicitable. The cremasteric reflex was hyperactive. The cranial nerves were intact. Abnormal cerebeller signs were absent.

Neurological Examination:

C-2-1 went along willingly with the Examiner. He was cooperative, v alert, and followed things very closely. He was curious about things but it took a little time for him to catch on. Cranial Nerves--the first cranial nerve was not tested. The second cranial nerve--the boy is able to see without any difficulty. Visual fields on gross confrontation were normal. The fundi showed discs that were well outlined and without any palor. There wer no hemorrhages or exudates present. The vessels seemed normal. Third, fourt and sixth cranial nerves--the extra-ocular movements were intact. No nystagmus could be seen on bilateral gaze. Pupils reacted to light and to accommodation. Fifth cranial nerve--corneal reflexes were present bilaterally. He was able to feel tough and pin prick on his face equally on both sides. The muscles of mastication were all intact. Seventh cranial nerve--there is no evidence of facial paresis. Eighth cranial nerve--tuning fork was heard without difficulty bilaterally. Gross hearing tests were completely normal. Ninth and tenth cranial nerves--child was able to swallow without difficulty. The uvula was in the midline. Gag reflex was not tested. Phonation seemed t be intact. There is no evidence for difficulty with his speech. Eleventh cranial nerve--he was able to shrug his shoulders without difficulty and he was able to hold his head to one or the other side with great strength. Twelfth cranial nerve--the tongue protruded in the midline, showed no signs o atrophy or phthisications. Sensory--The boy is able to feel pin prick, vibratory and touch on all parts of his body without difficulty. In addition, he able to make two point discrimination and pin prick localization. He is able to localize his body parts when asked to do so. Reflexes--The reflexes in th arms are equal and active bilaterally. Reflexes in the legs are equal and active bilaterally. The ankle jerks are somewhat more brisk than the knee reflexes. Pathological reflexes are absent. Abdominal and cremasteric reflexes were not done. Motor--He shows good muscle strength throughout. His hand grips are normal. He has no deviation of the arms or legs when held out in space. Cerebellar--Boy shows good coordination throughout. He is able to do such things as spin a jack to make it act like a top with his right hand and somewhat with his left hand. In addition to that, hand patting tests are normal bilaterally as are the finger to nose and heel to shin tests. He is able to get up from a sitting position without any difficulty. There are no signs of ataxia, either trunkal or in the extremities. Station and gait--The boy stands in an erect position. The Romberg is negative. He is able to stand on one foot without too much difficulty. He is able to walk on his heels and on his toes without any great difficulty. He walks in a normal fashion, swinging his arms as he walks. Movements--No extra pyramidal movements could be seen. He seemed to be somewhat more active than would be usually found at this age. However, he was able to calm himself down when requested and acted in a fairly normal fasion. Comment--The boy seemed to be able to

:h simple things as add one and one. When asked what three from 100 ıe said 89, then changed himself to 98 and then changed himself to 97. ımed to be able to reason things fairly well, although sometimes it ıim a little bit longer. He often jumped to conclusions which were without thinking and then went back and corrected himself without beked to correct himself.

Electroencephalogram: Attitude and condition of patient: alert, lly restless. Fundamental frequency: is ill-defined at around 8 and 9 per second. Slow waves: throughout the baseline is choppy and short ces of bioccipital 6 per second waves are observed (these are not pro-). Fast waves: except of muscle origin, are not prominent. Amplitude teristics: average voltage; poorly modulated. Additional feature: no smal activity is recognized. Hyperventilation: not accomplished. Imon: within the range of normal variation.

Speech and Hearing Evaluation: General Appearance: C-2-1 came eagerly he room and freely engaged in conversation. He was interested in what e going to do, and did not appear the least bit disturbed by the "hospippearance of the examining room. He is a thin, wiry lad whose overall nation was good. He was clutching the remains of a bottle of coke which ered to share with the Examiner. He had a golf ball from which the ıad been removed that he was unwinding. During most of the examination tched this ball of thin rubber and his major interest was to string it oject to object around the room to make a telephone line. He discussed oject very freely. When asked to come over to the Examiner for various of the examination, he cooperated willingly but as soon as the immediate : hand was over he immediately went back to stringing his telephone line. end of the examination he apparently sensed that I was in a hurry to get :s. When he was urged to wind it up so we could go, he bacame even slowıis movements. He was very pleasant about it, showed no negative be- but he could not be budged until he had completed his task. He ex- everything in the room during the course of the examination. This ıot be described so much as hyperactivity as an intentness to do what .ed to do. No tic was observed today.

Speech and Language Development: The child's mother was not present o no details of speech and language development could be obtained. It e my impression from reading over the pediatric history that there has significant delay.

Oral Examination: There is a marked overbit. The lips are held in an sition because of the oral structure. However, this child has no diffin closing his lips in order to produce the labial sounds. The velum is uate length, and thereis equal lift. There is good naso pharyngeal . The tongue has good motility. It is used with precision and accuracy production of all speech sounds. He can move his tongue into any reposition.

Articulation: Speech is intelligible. There are no defective sounds. t affricatives are sharply articulated. All the blinds are good. He has a good ear for speech imitation and reproduced any polysyllabic words with great ease.

Voice: Voice is of good quality. There was no unusual hoarseness or breathiness. Voice is not nasal.

Propositional Speech: C-2-1 converses easily on a variety of topics. He talks at rather a slow rate, but this is felt to be his way of monitoring his own speech. His language comprehension is good, as is his use of language. His sentences tend to be six and seven words in length. He has a good vocabulary range for his age. Thought content is good. He is using complex sentences. He has no difficulty in naming objects or selecting the appropriate object when it is described to him. He demonstrated a good memory for complex sentences and repeated them accurately.

Hearing: No audiometer was available today. When he was stood fifteen feet away, in as soft a voice as could be articulated, he quickly and readily repeated some 25 phonetically balanced words. This, along with his ready understanding during the whole examination, precludes any marked hearing difficulty.

Initial Impression: Speech and language comprehension are up to his age level.

Psychiatric Evaluation: C-2-1 (with whom the Examiner had had previous contacts), on entering the examination room, immediately asked whether we still had that "train". He was obviously excited to be back.

He began by saying that school was too hard and that he and some friends were going to run away to an island, taking his father's gun and some B-B shot. This story was accompanied by facial grimacing and a serious expression. As he told the plan, he attempted to crawl into the bottom shelf of a cupboard (an activity he enjoyed in past interviews) but gave the idea up, saying as he did so, "I'm too big now."

C-2-1 continued to express his dissatisfaction with school but when pressed for specific comments, his reply was "I do not like to work; I like to play." and with this comment squirmed his way into the cupboard and closed the dorr making noises like a train to keep the Examiner informed of his presence.

In previous interviews, C-2-1 played with planes, bombs and racing cars. He declined to draw or play with puppets. He appeared to be a serious minded youngster, smiling only occasionally. During this interview, the subject appeared more anxious and the facial tic was more prominent than in past hours, althoug his drawings were less confused than in the past and he appears from classroom observations to have made definite progress in group participation.

Psychiatric Re-evaluation: C-2-1 put himself in the cupboard, as he had in a previous interview, but after a short period came out. He seemed to enjoy hitting the punching bag. He showed better coordination than in the past. No facial tics were present today.

He talked spontaneously about school saying that he liked the people alright but that he did not like the work. As this discussion continued he said "You mean life is hard for everybody?" This matter of school being hard has been a recurrent theme.

In general, the child's approach to finger painting and to the gun shooting was much more controlled. He could stop and start activities as well as accept suggestions readily. In an earlier interview, the subject pleaded to continue the hour and asked when there would be a second visit. Today he accepted the reality of the situation and left in a cheerful frame of mind.

C-2-1's mother finds him to be much more independent. She can rely on him now to go to the store or to be safe on his bicycle or leave her when they go shopping. She feels that he continues to be hyperactive.

The child appears to have developed considerable emotional maturity over the course of the past year and evidently to have profited from the classroom experiences.

Psychological Examinations:

Stanford-Binet, Form L (Pre-test) (2-25-57)

C.A.: 7--8
M.A.: 8--2
I.Q.: 107

S's mental age is 8--2, with an I.Q. of 107. In previous testing (10-6-55), using the Form M of the Stanford-Binet, the mental age was 6--10, with an I.Q. of 109. Thus, the rate of intellectual development is quite constant. The only item missed at Year VII was the copying of a diamond. At Year VIII, S could not handle the verbal absurdities. He was inclined to give up too easily. "That's too hard," and "I don't know" were ways of handling the problem. No amound of questioning or prompting could elicit further effort.

At Year IX, S was unable, again, to see verbal absurdities, copy designs from memory, make change, or repeat four digits reversed. He was able, however, to make rhymes and repeat six digits forwards. Vocabulary was passed at an eight year level. He is a very verbal little boy who seems to find pleasure in using words, and uses them quite accurately. Some of his responses on the vocabulary test indicate a fairly high level for his age.

Stanford-Binet, Form M (Post-test) (5-15-58)

C.A.: 8--11
M.A.: 10--2
I.Q.: 114

There is a seven point difference between the pre- and post-test Stanford-Binet I.Q.'s, both being within the Average range. The eight year performance range extends from a Basal Age at Year VIII to a Ceiling at the Average Adult level.

Two items were failed at Year IX. S was unable to see the absurdity in verbally presented situations. Neither could he see the similarities and differences between quite common things. He could see the similarities, but not the differences.

Two items were failed at Year X. Auditory organization, as involved in memory of stories, was quite poor, as was repetition of six digits. Number concepts are relatively well developed as was the definition of abstract words and word naming.

At Year XI, one item was passed, seeing the similarity of three things S gave aualitatively very good similarities. He was unable to solve verbally presented problem situations, copy a bead chain from memory, or repeat sentences from memory.

At Year XII, two items were passed, memory for designs, and repeating five digits reversed. Memory for sentences was passed at Year XIII, on the second attempt. This was an unexpected success in view of the fact that memory for sentences was not passed at Year XI.

At Year XIV, one item was passed, the reconciliation of opposites. S's responses were quick and qualitatively quite good on this item. For example, when asked how *winter* and *summer* are alike, he said: "Both are a month For *happy* and *sad*, he said: "Ways you feel about something." For *much* and *little*, he said, "Both amounts of something."

Ammons Full-Range Picture Vocabulary Test (11-27-57)

C.A.: 8--6
M.A.: 9--6

The mental age obtained on this test is about six months greater than the Stanford-Binet I.Q. The following words, expected at a higher chronological age, were passed by S: mercury, perspiration, sympathy, and mishap.

Goodenough Intelligence Test

Pre-test (2-26-57)	Post-test (5-12-58)
C.A.: 7--8	C.A.: 8--10
M.A.: 7--9	M.A.: 6--3

There is little change in the pre-and post-test drawings. In fact, the post-test figure is somewhat less detailed, lacking the eyebrows and ears of the pre-test figure. Both drawings have a square trunk on which the arms and legs seem to be hung, with arms outstretched, and hat perching precariously on top of the head.

Block Design and Coding from WISC (2-26-57)

	Raw Score	Scaled Score	Equivalent Test Age
Block Design	13	12	9--6
Coding	46	14	10--2

Designs A and B were constructed very rapidly and accurately on the first attempt, while Design C was completed just short of the time limit on the second attempt. Designs 1 and 2 were constructed without difficulty, but from that point on S could not make the correct designs, and became quite anxious.

On the Coding, Form A, S substituted all of the symbols with 15 seconds to spare.

Both subtests from the WISC score considerably above the mental age obtained on the pre-test Stanford-Binet.

Bender-Gestalt Test

On the pre-test (2-26-57), there were thirteen errors, with one concrete, one perseveration, two dissociations, two incorrect elements, two unrecognizable, three distorted angles, one rotation, and one disproportion. On the post-test (5-12-58) there were eight errors, with two dissociations, one incorrect element, two distorted angles, one compression, and one disproportion.

Syracuse Visual Figure Background Test

On the pre-test (11-18-57), there were seven correct responses to the figure, with no instances of perseveration or background reactions. Post-test (5-12-58), however, there were nine correct responses to the figure, one background response, and two perseverations. Thus, at the end of the year, there was greater accuracy, but also evidences of disturbance in figure-badkground relationships that were initially lacking.

Tactual Motor Test (2-26-57)

After feeling the triangle, S said: "I can't draw exactly what it was. It felt *something* like a valentine." He then proceeded to draw a circle with a slight indentation near the top. Bender Designs 4 and 6, with plain background, were incorrectly drawn. When a thumbtack background was added, S was quite confused, and tried to draw in the background as well as his misinterpretations of the stimulus figures.

Marble Board Test (2-26-57)

Marble Board 1 was correctly reproduced rapidly and accurately. The drawing S made of it shows a good grasp of the basic pattern. Marble Board 2, despite the efforts of S to count, was not entirely accurate, having three misplaced marbles. In his drawing the basic pattern was recognizable, but was greatly elaborated.

Vineland Social Maturity Scale

Pre-test (11-18-57)		Post-test (5-15-58)	
Total Score:	56.5	Total Score:	76
Age Equivalent:	5--1	Age Equivalent:	9--8
Social Quotient:	60	Social Quotient:	108

The mother served as informant in both interviews. S has developed many new social skills and abilities over the course of the year, which is reflected in the difference of 48 points between pre- and post-test social quotients. Some of the things that he could do at the end of the year that he could not at the beginning include playing simple table games, going to school unattended, using a pencil for writing, telling time to a quarter hour, using a table knife for cutting, participating in pre-adolescent play, combing and brushing his own hair, making minor purchases, writing occasional short letters, making telephone calls, and being left to care for himself and younger children.

The mother feels that, at home, S is as noisy and active as he has been in the past but that he is now more reliable and will do what is asked of him.

Summary

Intelligence is within the average range. Ability to see similarities which involves a relatively high abstract ability, was especially noteworthy. S was able to See similarities and reconcile opposites at the Year XIV level.

There was improvement on four out of the five psychological tests on which there is a pre- and post-test available for comparison. The post-test Binet was seven points greater, there were fewer errors on the Bender-Gestalt Test, greater accuracy on the Syracuse Visual Figure Background Test, and a 48 point greater social quotient on the Vineland Social Maturity Scale. The only test which showed no improvement, and in fact was slightly poorer, was the Goodenough Intelligence Test.

The most striking improvement over the course of the past year has been in the development of social skills and abilities. This was especially noticeable in observations of classroom behavior.

PEDIATRIC HISTORY: C-2-2

The information was obtained from both parents who were not particularly sure that they wanted C-2-2 included in this Study. They had just spoken to the Resident Coordinator and had not quite made up their minds. Some of the questions they had indicated that the father, especially, wanted assurance that this would be the best and he apparently was not willing to do it unless these assurances were met. Initially, he did most of the talking, not looking directly at the interviewer, and later on the mother entered into the discussion and information giving.

Problem:

The difficulties of C-2-2 apparently started off with speech. He received speech therapy and was making progress. Then he had some difficulty reading, (which father said he had supposed would be the case). Last year there was a question of discipline in school as well. Because of the discipline problem and the speech and reading difficulties, he was placed in Special Education, (at the end of his first year in school).

He seems to get excited when something new occurs and this difficulty became more apparent when he entered the second grade. At home apparently he isn't much of a discipline problem although he is said to be quite strong-willed. His reading difficulty seems to center around a reversal problem with his B's and P's, his S's, W's, and M's. This was noticed by the parents. He has had a neurological examination, including an EEG which apparently was normal. At the Clinic where this was done, no reason could be found for some of his difficulties and at that time the suggestion was made that a psychological testing should be done and Special Education might be helpful. Last year, when in Special Education, he seemed to do well. He presently is receiving remedial reading instruction from a neighbor who apparently does this work quite well. There was no apparent retardation in appearance of speech; it is just that it was always unclear and immature. His speech has markedly improved, although there are still one or two sounds which he still doesn't get right. His dislike for school might have stemmed from the difficulty with some of his playmates who were making his life rather miserable because of his inability to function on their level. He tends to get excited easily in groups and is certainly easier to handle in a smaller group setting or when alone. He is said to open up more with other people than he will at home with his parents.

Family Backgrounds:

1. Maternal grandmother living and well.
2. Maternal grandfather living and well. The grandparents are separated.
3. Paternal grandmother died when he was only two years of age in the epidemic of influenza.
4. Paternal grandfather died of cancer.
5. Mother has one brother who is living and well.
6. Father has one brother and one sister, both of whom are living and well. The sister has two girls who apparently are also

having reading difficulty.

Family History:

Father: forty-one years of age and in good health. He wears glasses for myopia and has retenitis pigmentosa. He is a research assistant at a physics lab, has a Masters in electrical engineering.

Interests: reading, community discussion groups.

Problems: he was raised by an aunt but travelled about quite a bit, from one relative to another, until he was seven years of age, at which time his aunt and himself went to live with his father. He was always small for his age and therefore had difficulty defending himself.

Personality: quiet, retiring individual who is said not to be an extrovert.

Attitude toward patient's difficulties: he tried to be very understanding and patient and he said that he might be a little more strict than other parents in the neighborhood.

Mother: thirty-eight years of age and in good health. Used to do clerical work and finished high school.

Interests: handiwork and photography.

Personality: quiet, calm and cheerful.

Attitude: not nearly as concerned as other people seem to be with some of the difficulties of C-2-2.

Marriage: the parents have been married for fourteen years. It is

Marriage: the parents have been married for fourteen years. It is

the first marriage for both. The marriage is said to be compatible. Although they are not of the same religion, this is not a problem.

Siblings: none.

C-2-2 has a cat and more recently has acquired a rabbit.

Mother's Past History:

The mother has had three miscarriages, one at six weeks, one at four weeks, then C-2-2 was born and the third one since his birth, at four weeks. Apparently no explanation for these miscarriages has been given. During her pregnancy with C-2-2 she received hormonal therapy. Apparently there was an indication of her losing George, due to bleeding, and so she was put to bed where she remained for about six months of the pregnancy and received Stilbesteral. She was thirty years of age at the time of his birth. C-2-2 was born in a local hospital. The bag of water was ruptured six or eight hours prior to delivery. The delivery itself was uneventful except that C-2-2 apparently was born a month earlier than the due date. His birth weight was five pounds, seven ounces. He was seen within the first twelve hours. He was placed on formula feeding and was slow in eating and sucking. Apparently he tired easily, although there was no difficulty in the actual nursing or in swallowing.

Past Medical History:

DPT and smallpox vaccination during first year of life. He has had his polio immunizations. He had chickenpox at the age of five, measles at the age of seven, mumps at the age of six. At two years of age, on the way back from a trip, he was hospitalized. Apparently he had a type of breathing difficulty which was described as asthma, and at that time, during his hospitalization an anemia was discovered and he was transfused. Since then he has been on medication for the anemia and apparently at present is back to normal. He has never had any convulsions and concurrently is on no medication.

Developmental History:

C-2-2 was always a slow feeder, he was slow in sitting up, standing, walking and teething, as well as speech. He seemed to be a happy baby though. His bottle was propped. There was no sleeping difficulty. He started counting when he went to kindergarten and was able to understand and perform instructions and commands. There was apparently no visual or auditory difficulty. He likes to be outside playing a great deal and will sit and watch TV only is he is really interested. Doesn't like to sit through Sunday school. His toilet training was uneventful being accomplished by three years of age with no history of enuresis. He is said to be right-handed and at one time there was a question of whether he might not have been ambidextrous. He is said to be able to dress himself and does better with one other playmate rather than a large group. He is said to be able to ride a two-wheeler bicycle and to roller-skate and is said to be active in general. At the table, he used to fidget quite a bit but is much better now. He does not suck his thumb, bang his head or rock.

Personality: logical, loves to argue. He is not particularly friendly.

Punishment: he is either spanked or put in his room. He will argue at first and then sort of respond.

Fighting: he is able to fight and will fight.

Frustration: he gets and throws things but does not have actual temper tantrums.

Physical Examination: Blood pressure 100/60.

General appearance: C-2-2 was a pleasant boy who came along without difficulty and who was noted to talk in a rather babyish, immature way. When we walked into the examining room he recognized the pipe on the table and immediately put it into his mouth, saying that he smokes and asked me to light the pipe for him. He wanted to know what I was going to do, adding "you are not going to put me to sleep and cut me open--I'm too tough--I could not knock your brains out". He kept jabbering away about this and was somewhat hyperactive.

His three wishes included (1) jet bomber, (2) helicopter, (3) horse. He said he didn't know about a good mommy or a bad mommy. To the ambulance story he said "a man who was driving it was killed with a twelve gague shotgun". He recognized a penny, nickel, dime and quarter and knew their values. In counting, he said "thorty" for thirty, and "thorteen" for thirteen. Of note is the fact also that he kept saying "I don't know" rather than risking an answer which he was unsure of. However, when reassured,he frequently did give a proper answer.

C-2-2 was able to hop equally well on both feet and could skip. He was able to walk on both heels and toes.

The remainder of the physical examination, including the neurological exam, was negative.

When approached for an examination of his genitalia he made a movement to protect them. He was able to dress himself rather well, including the tying of his shoelaces.

Neurological Examination: Cranial Nerves--First cranial nerve was not tested. Second cranial nerve--Visual fields were normal. Fundi normal. Third, fourth and sixth cranial nerves--Pupils were equal and round and reacted to light and accommodation. Extraocular movements are intact. No nystagmus is seen. Fifth cranial nerve is normal for motor and sensory function. Seventh cranial nerve is normal for motor function. Taste was not tested. Eighth cranial nerve--The boy was able to hear the tuning fork on both sides without difficulty. Air conduction is greater than bone conduction. There is no lateralization. Ninth and tenth cranial nerves--Gag reflexes normal. The boy was able to swallow without difficulty. The uvula went up in the mid-line. Eleventh cranial nerve--The boy was able to shrug his shoulders without diffciulty. Twelfth cranial nerve-The tongue protrudes in the mid-line. Sensory--Normal forpin prick, touch, vibratory, position and stereognosis. Two point discimination and other modalities involving the cortex are also normal. No extenction is seen in this boy. Reflexes--Reflexes are equal and active throughout. No pathological reflexes were present. Motor--Motor system is normal. There is good strength throughout. Cerebellar--Finger-to-nose and heel-to-shin tests were well performed. He was able to spin the jack well with his right hand, but not so well with his left hand. Station and gait--The boy was able to walk on his heels and on his toes without difficulty. His gait is normal. Comment-There is some slurring of speech when he talks. The boy is right-eyed and right-handed.

Electroencephalogram: Attitude and condition of patient: alert and cooperative. Fundamental frequency: ranges between 8.5 and 9 waves per second. Slow waves: occasional short volleys of approximately 5 per second waves are observed in the frontal derivations (bilateral). With the onset of sleep this activity became more prominent. With sleep the normal frontal and parietal slow activity became dominant. Fast waves: are not prominent, but short runs of bifrontal 18 per second activity is observed. Amplitude characteristics: average to high voltage (100 microvolts); irregular modulation. Hyperventilation: accentuates the prominence of the bioccipital slow output. Impression: Moderate generalized abnormal EEG.

Speech and Hearing Evaluation: His early difficulties centered around his speech and he has been having difficulties with reading. The general developmental picture suggests considerable retardation. C-2-2 sat up at ten months and walked at thirty months, with no following difficulties in locomotion reported. Mother reported that he babbled a lot as a young infanct but there was evidently a long period of pre-speech jargon. Around the age of three he bagan to talk in phrases, rather than in words. Speech was then very unclear. The summer before he entered kindergarten, the child was taken to the Speech Clinic where they worked with him for about two years. In first grade he received his speech therapy in school. His speech has been described as follows: ". . . shows a marked dyslalia, with many details of infantile articulation carried over. There is a fairly severe laterial lisp and distortion of all the alveolar sounds as they occur in the sound blends. The blends are generally poor, as is his connected discourse". Mother reports that he has not been having speech therapy for the past year. Improvement has been gradually occurring. Mother feels that he still has some occasional errors.

Behavioral Observations: C-2-2 came willingly with the Examiner. He is a well-dressed, clean looking youngster. At first his manner was very tentative and all his gestures were in "slow motion". This is in line with his speech which is quite prolonged. He would engage in some of the test procedures but would immediately return to those objects in the room that had attracted his attention. He was not uncooperative, but determinedly willful.

Oral Examination: There is a marked overbite. Teeth are widely spaced and there is a high palatal arch. Tongue and palatal mobility are good, as is pharyngeal stricture. He has good control of his tongue and lips.

Articulation: This child's speech has improved. The *s* and *s* blends are still unstable. *J* is pronounced as *ch* and there is still distortion of the alveolar sounds as they occur in sound blends. There are many vowel distortions, particularly on the diphthong, but these are not consistent.

Voice: Voice is unprojected and prolonged.

Propositional Speech: The content of this child's connected discourse is good. We started talking about airplanes and he indicated that he was going to be a pilot. He then got into a discussion on the differences between a propeller and a jet plane. When he is talking freely about a topic in which he is interested, he is using complex sentences and a good vocabulary. His vocal utterance stands out because of the prolongation rather than the articulation errors.

He knew all the animals and gave a sentence about each one. He was quite scornful about the idea of telling the story about the picture. He started to tell about the picture of shopping at the A & P - "they went shopping too" and then he broke in with a loud "no". He then grabbed the picture about the family and muttered scornfully - "they kissing and all that crazy junk - peuhi!" The ejaculation was said with real feeling. He looked over the one about fishing and commented "they already caught some fish - they are just beside some boats". He was finally induced to tell the story of The Three Bears, which he did in quite some detail, but intersperced with giggles and playing with cigaret tobacco which he took from a pack lying on the desk.

Hearing: This child's hearing is well within normal range. He gave the following puretone audiograms:

Right	15	20	10	0	-10	5
	125	250	500	1000	2000	4000
Left	10	15	10	0	-10	0

He repeated the spondee words quickly and accurately. He missed three of the PBK words. It was felt that this was more the lack of attention than inability to hear.

Impression: While this child's speech has improved, it is still conspicuous in its prolongation and vowel and alveolar distortion.

Psychiatric Evaluation: C-2-2 is a friendly youngster whose speech sefect was quite noticeable today but everything he wished to say was understood without difficulty. He was quite mischievious during the hour and attempted to tell jokes and play jokes on the Examiner. In testing a bullet from the cork gun, he lined up a good target and fired but discovered that the bullet went a few inches and dropped down without having any projectile force. At this point he said "oh, that's not much of a gun."

He joined the fence sections quite easily, building up a little phantasy around the fence and the ranch house, having one side of the hourse on the edge of a 200 foot cliff. He arranged it so that when the button was pressed, the house would swing 180 degrees and three airplanes which had been hidden in there, would be brought into the yard, and after 40 seconds, would move into its former position "and the airplane that didn't get off in time would just have to know what was coming to it." He offered some technical knowledge about the anti-aircraft truck he was playing with. He would not divulge his source but facts as well as a good phantasy life were demonstrated.

When asked what the baby bird would do when its nest was blown away, he replied "the bird would build his own nest." When asked about the elephant would be bigger and heavier."

There was good gross and fine motor coordination. He shuffled playing cards quite well. He asked to play Old Main and this was done with lots of spirit and gusto. It was established that he could not read the names on the cards, e.g. one out of four tries was correct.

This was the only boy seen for the Project who ventured to give a ›r his birthday. He was unwilling to state what month we were in, ıe did talk of the summer season. He guessed the year when asked, .08. His three wishes were: (1) to fly himself like Superman, he ıted with flowing gestures and said "fly", (2) "all the magic in the and he smiled in an impish manner; (3) a jetplane.

At the end of the hour he was asked to draw a person, and said "I will ", at which point he drew a big head and ears of a rabbit. Another earing below on the paper was egg-shaped with the egg lying on its the head size. The facial features were added, finally, in pencil. a very immature, odd body which was not a stick figure and had a shorts only for clothing. His remark was "here's you in your under- in the wetting". It should be said that a few moments before the was begun, there was a cloudburst.

Comment: It may be that this child, although reported as having aver- lligence, has the potential for superior intellectual functioning. In ridual setting he gives evidence of difficulty with impulse control.

?sychiatric Re-Evaluation: C-2-2's behavior was essentially the same ıitial contact, i.e., the same boundless energy, difficulty in follow- :tions, and much aggressive drive. In the absence of the pop gun, the majority of the hour hitting Bobo's replacement around the room. i good strength and his coordination was above average. As he punch- .ked rapidly and with an adequate vocabulary. He did not mention his ›r his father. Much of what he had to say was superficial and he i to speak with a kind of babyishness but his words were understood .mes.

The child was asked to make a drawing of anything he wanted plus a ›f a person. He drew an action picture in which a Nazi plane fired :my fort. When asked who this fort belonged to, he said, "the Ger- le gave the same reply as last year to draw a person saying "I'll draw . this time he was asked to try something else. He drew a man with a face resembling a rodent. The bizarre distorted hands and fingers, e larger than the hand, were placed upon a trunk which dwindled away ›ering. feet.

onversation with mother: the child's mother stated that she had too much change in her son. She said it was still hard to get him ngs. Also, she found it hard to do the things that she was supposed her relationship with the child. She does feel, however, that he has to get along with a larger group than his usual number of two or ıngsters. But he may have trouble with certain friends because he is a little critical and not too forgiving.

omment: There appears to have been little behavioral change noted hild and his school progress has likewise been one of the poorest.

Psychological Examination:

Stanford-Binet, Form L (Pre-test) (7-19-57)

C.A.: 8--4
M.A.: 8-10
I.Q.: 106

Present intellectual functioning falls within the Average range with an I.Q. of 106 and Mental age of 106 and Mental age of 8-10. This is consistent with testing done 7-30-56, when an I.Q. of 100 was obtained, mental age 7-4. Thus the rate of intellectual development seems to be quite consistent. The seven year range of performance was from Year VI through Year XII. The Basal Age was at Year VI, while the ceiling was at Year XII.

All items were passed at Year VII with the exception of comprehension. In this item a situation is verbally described in which the child is expected to grasp the essential factors involved. For example, when asked what he should do if he accidentally broke something which belonged to someone else, he said: "Nothing." When asked what he should do if he were on his way to school and saw that he was in danger of being late, he said: "I wouldn't go at all then." Abstract ability, as in seeing the similarity between two thing was good, and he was able to make three good diamonds.

At Year VIII two items were missed, verbal absurdities, and, again, comprehension. Auditory organization, as in repeating sentences, was good, as was ability to see similarities and differences.

At Year IX two items were failed, verbal absurdities and repeating four digits reversed. In the absurdities, for example, when asked what was absurd about the statement that only recently a small skull had been discovered in Spain which was believed to be that of Christopher Columbus when he was about ten years old, S said: "He wouldn't die when he was ten, because he wasn't old enough to die." Attention span,as measured by repetition of digits, was inadequate at this age level.

At Year X two items were passed. Eleven words must be defined to pass the vocabulary test at this level, which S did. He was also able to analyze a situation presented pictorially. He was unable to read even the simplest words at this level. For example, he read "I" for "a". He could not find reasons for various problem situations. He did not pass the word naming test. In this test the child is instructed to say as many words as he can in one minute. At least twenty-eight words are expected at this level, and S was able to produce only eighteen. He started out very well and named the objects in the testing room, but then he "blocked" and could not continue. He also could not repeat six digits.

At Year XI two items were passed, the memory for sentences and similarities of three things. This indicates that auditory organization at least as far as meaning is concerned, is relatively good, as is abstract ability.

Stanford-Binet, Form M (Post-test) (5-23-58)

C.A.: 9--2
M.A.: 8-10
I.Q.: 96

Intelligence is Average, with a performance range of seven years from a Basal Age at Year VI to a ceiling at Year XII.

At Year VII one item was failed, memory for sentences. S. transposed phrases and left out words.

Comprehension was failed at Year VIII. This item involves a problem situation presented verbally. In answer to an inquiry as to what a man should do if he came home and found that his house had been robbed, S said: "Go out and try to find the burglar."

At Year IX S was unable to draw designs from memory, rearrange a series of disarranged words so that they made a sentence, or make rhymes. He knew what rhymes are as may be seen in the first series of responses, but was unable to produce enough rhyming words. He saw the absurdity in verbal absurdities, gave good similarities and differences, and repeated four digits reversed.

At Year X S was able to name more than twelve animals in one minute, and count the number of blocks presented on a card. He could not repeat six digits, define abstract words, or remember the details of a story that was read to him.

At Year XI two items were passed, verbal aburdities and abstract words. S was unable to find reasons for problem situations, copy a bead chain from memory, see similarities between three things, or repeat a sentence from memory.

All items were failed at year XII.

Ammons Full-Range Picture Vocabulary Test (7-19-57)

C.A.: 8--4
M.A.: 9--0

The mental age obtained on this test was only two months greater than that obtained on either of the Stanford-Binets. S passed a number of words that the average child of this chronological age is not expecte to pass, including purchase, panels, sudden sympathy, and gravitation.

Goodenough Intelligence Test

Pre-test (7-19-57)	Post-test (5-12-58)
C.A.: 8--4	C.A.: 9--1
M.A.: 6--3	M.A.: 6--3

Both the pre- and post-test drawings are very crude for this ronological age level. The first drawing is a tightly compressed figure ar the extreme upper edge of the paper, with huge, wing-shaped ears, and e single hair coming from the top of the head. The second figure lacks e facial detain of the first, but has the correct number of fingers repsented. In general, the post-test figure was more poorly executed than e pre-test.

ock Design and Coding from WISC

	Raw Score	Scale Score	Equivalent Test Age
ock Design	14	11	9--6
ding	20	7	6-10

All of the block designs up to Design 2 were done quickly and curately on the first attempt. S could not form the diagonals in sign 3, attempting to rotate the complete design instead.

On the Coding test, Form B, twenty-one symbol substitutions were tempted, with one error.

der-Gestalt Test

Fourteen errors were made on the pre-test (7-19-57) with one mature, one perseveration, two dissociations, one incorrect elements, distorted angles, one rotation, three enlargements, and three disportions. Only ten errors were made on the post-test (5-12-58) with immature, two perseverations, two distorted angles, two rotations, three enlargements. The main improvement may be seen in fewer rors categorized as dissociation and disproportion.

acuse Visual Figure Background Test

In the pre-test (10-24-57) there were eight correct responses to gure, two perseverations, and ond background response. On the postt (5-12-58), there were ten correct responses to figure, one backund reaction, and no perseverations. Thus, improvement may be seen accuracy and lessened perseveration, but no change was shown in disctibility by background stimuli.

tual Motor Test (10-24-57)

S correctly drew the diamond, both with plain and with structed backgrounds. The other drawings have no resemblance to the mulus figures.

ble Board Test (11-18-57)

Marble Board 1 was reproduced quickly and accurately. drawing shows a good grasp of the basic configuration, ., overlapping squares. Marble Board 2, however, proved to be difficult. S counted the correct number of marbles for horizontals, but could not construct the diagonals,

Shot.

despite many shifts and changes. His drawing shows two dissociated pentagons.

ineland Social Maturity Scale

Pre-test (11-19-57)

otal Score: 65
ge Equivalent: 7--0
ocial Quotient: 81

Post-test (5-15-58)

Total Score: 77
Age Equivalent: 10-0
Social Quotient: 109

The mother served as informant at both interviews. The post-test,
ocial quotient is twenty-eight points higher than the pre-test, reflecting
he observed progress made in classroom behavior over the course of the year.

S can do several things at the present time that he could not do for-
erly, such as using a pencil for writing, going to bed unassisted, doing
outine household tasks, bathing himself unaided, caring for himself at the
able, going about home town freely, making telephone calls, doing small
emunerative work, and being left to care for himself and other smaller child-
en.

At the beginning of the year his mother commented that in *doing*
hings he was like a nine year old, but in a group his behavior was more
ike that of a seven year old. Although he does not contribute much in-
ormation about his school activities, his mother feels that he is widening
is circle of friends and is much more competent in dealing with other child-
en now.

ummary:

Intelligence is within the Average range. Difficulty was noted on
he Stanford-Binet with tasks requiring auditory organization, such as re-
etition of sentences from memory, problem situations, and memory for a story
hat was read to him. Vocabulary and abstract thinking, as involved in see-
ng similarities, were passes at a level higher than his chronological age
ould indicate. Visuo-motor tasks were also difficult for him, such as the
tringing of beads according to an example presented by the Examiner.

S showed improvement on three of the five tests on which both a pre-
nd post-test is available for comparative purposes. He made fewer errors on
he Bender-Gestalt, showing fewer dissociations and disproportions. On the
yracuse Visual Figure Background Test accuracy was greater and perseveration
ess, but there was no change in reactions to background stimuli. There was
great change in the rate of development of social skills and abilities, S
ow being able to do many things that were either absent or just emerging at
he beginning of the year.

PEDIATRIC HISTORY: C-2-3

Problem:

When asked about C-2-3's problems, the mother seemed quite suspicious and guarded. She thought a good deal before answering and presenting his problems. In her own words she felt that basically it is the fact that the child has a brain injury supposedly occurring at birth. She went into further detail, stating that he had motor seizures which were actually the first symptoms for which she sought help. At approximately eleven months of age she noticed for the first time that he would blink his eyes and tense his upper extremities. It seemed at first as if he were playing. When she called this fact to the attention of the pediatrician he felt there wasn't very much to be concerned about and tried to reassure her. At two years of age these same symptoms were apparently becoming more frequent. It was at this time that a neurologist began seeing the boy and he diagnosed the difficulty as minor convulsions due to brain injury, probably due to hemorrhage at birth. The mother said there was no loss of consciousness, no rolling of the eyes and no gross convulsive movements, just the fine movement of both hands and the blinking of the eyes. She hastened to add that he slept well and did all the things he wa supposed to do, turning his head, gaining weight and teething. He was put on medication by the neurologist and only had occasional seizures, the last one having occurred about six years ago and none since. He has been having repeated EEG's which are said to be showing some improvement.

It was not until I specifically asked whether C-2-3 was having any school problems that the mother talked about them. It seems he started nurser school at three years of age. He was thought to be "brilliant" but displayed a short attention span. He was quite verbal with an excellent vocabulary. He did, however, have a tendency to ramble. At the end of the school year when he was five, the school suggested private school because, according to the mother, of his small physical size and because it was suggested that he would benefit from a smaller group in such a setting. Apparently he was having difficulty with eye-to-hand coordination. It was at about this time that a physician tested the boy and found that he had a distorted pattern of function The physician is said not to have interpreted the test results in terms of brain injury. It was at this point that the mother mentioned that C-2-3 could count abstractly but not specific objects. At the private school he attended the teacher thought that he might be having some visual difficulty (actually he wasn't recognizing written words). However, upon testing, his vision was found to be normal. At age five-and-a-half it was suggested (based on psychological testing) that he remain in kindergarten for another year instead of going on to the first grade.

Apparently it was not until after psychological testing at a local clinic that the term "retardation" was used and it was then suggested that the mother see the Supervisor of Special Education. The mother apparently is pleased with the progress that her son is making at school presently.

Description of Parent:

She is a rather pleasant looking woman who, as mentioned before, spoke quite freely and had excellent control and knowledge of medical terminology. I have the distinct impression that she was perhaps not being very honest, not only with me but with herself. She played with the matchbox and kept swinging her foot up and down while seated in the chair. She explained perhaps some of the difficulties in school upon the fact that she never told anyone, even the neighbors nor the teachers, about the motor difficulties or the minor convulsions that C-2-3 had had. She, of course, said that the neurologist had suggested that there was no need to tell anyone as it wasn't very serious. However, after the various psychological testings and when it became necessary for C-2-3 to be placed in a Special Class, she could no longer hide it. Actually after she told others she seemed to be quite relieved.

Family History:

1. Mother's mother is living and well. Has hypertension.
2. Mother's father died of a brain tumor.
3. Father's mother is living and well and also has hypertension.
4. Father's father fied of a coronary occlusion.
5. Mother has one brother who is living and well
6. Father has one sister who is living and well.

The mother further stated that a cousin of hers had some trauma of the head which resulted in convulsive-like seizures. An uncle of hers has diabetes and it would appear that the mother's grandmother and grandfather were cousins.

Family Background:

Father: Forty years of age--in good health--physicist--has a Ph.D. His interests include gardening, photography, tennis and bicycling with the boys. He, too, is said to have been small physically as a child and his parents were concerned about this. He had a duodenal ulcer which was treated medically and has had no recent recurrences. When confronted with C-2-3's problem at first he was confused but apparently has accepted it with "faith in nature doing right". In describing his personality the mother said he is a scholar, has lots of wisdom and a great deal of faith; he is an introvert, doesn't need social contacts or lots of people around him. He is self-sufficient and well controlled (rarely loses temper).

Mother: Thirty-nine years of age, good health, has a Masters and has taught school. Her interests: At first she said she had none; then she said she likes to sleep. Talking about her personality, she said she loves people, she is explosive, she is much more tempermental than her husband and she has been accused of being "the managerial type". Her initial reaction to C-2-3's problems was described as feeling "sunk". She felt that he would melt away. She cried a good deal. She would look at the baby and just cry. She said her husband came to the resuce in terms of expounding about faith and realism. She said she recovered rapidly. She said she was greatly disturbed at first by the burden placed upon her in concealing his difficulty, that is, in having to tell little white lies. She feels much more comfortable now that she can talk about it and she keeps thinking about what he might have been like.

Marriage: The mother was twenty-six years of age and the father was twenty-seven years of age at the time of the marriage and they have been married for thirteen years. It is described as a compatible, happy marriage. They have the same religion now, one having converted over from another faith. Bot are said to share in the marital responsibilities. She was teaching for a while, two nights a week, and then the father would stay home and take care of C-2-3.

Siblings: Brother, six years of age; he was described as being a "little mathmetician". The boys get along together fine and the younger brother is said to be a model child. C-2-3 will tease him but he apparently show a great deal of restraint and understanding. He recognizes the undesirable actions of C-2-3 but doesn't verbalize to C-2-3 or to his parents. (The mothe says she has heard him use the expression to his friends "you're just like my brother" whenever they do something which displeases him). She did not furthe elaborate, but stated that sometimes C-2-3 resents his brother's normalcy. C-2-3 has the following pets: a dog, a bird and a turtle. The mother spoke of the dog with disdain. She said it is dirty and smells and actually she doesn' want him around the house; however, the father felt that C-2-3 should have a dog and so she actually bought the dog for the boy.

Mother's medical history during pregnancy with child and delivery factors:

The mother was thirty years of age at the time of C-2-3's birth. The delivery was attended by an obstetrician. Prenatal care was begun four weeks following conception. The mother said she had back trouble and received physical therapy throughout most of the pregnancy. This therapy consisted of infrared lamp treatments and massage. There was no hyperemesis, no medication and no x-ray during the pregnancy. The delivery occurred two weeks past the expected date of confinement. There apparently was a fast labor and C-2-3 was rotated by high forcepts from a posteria position. His birth weight was seven pounds, eight ounces and he was seen by his mother within the first twenty-four hours following the delivery. He was breastfed for four weeks but apparently had diarrhea and wasn't gaining too well. He always seemed hungry. As a result he was placed on an evaporated milk formula.

Past Medical History:

C-2-3 received his DPT immunizations during the first year of life. He received his smallpox vaccination at eighteen montns of age. The reason for the delay was that they had moved from their former place of residence in the meantime. He has had his Salk Vaccine immunizations. He had chickenpox and measles, both of which were rather mild. He still has his tonsils and an occasional sore throat. He is said to have had an enlarged thymus at birth and received one x-ray treatment in addition to the original x-ray taken of his chest. The latter was done routinely at the hospital in which he was born. Two years ago he had a dental extraction for which he was given ether. He is said to have been exposed to chickenpox at three months of age although he never came down with the disease at that time.

Developmental History:

As previously stated, C-2-3 was breastfed for four weeks but he didn't seem very interested. He sucked well and mother finally gave it up. (it was too time consuming and made the mother nervous.) He had no difficulty on the evaporated milk formula. He is said to have had diarrhea at one month of age and later again at three months of age. The bottle was never propped. He started drinking from a cup at nine months of age and was weaned from the bottle at thirteen to fourteen months of age. He gave up his night bottle at fifteen months of age, then he threw it away. He was started on solids at three months--had no difficulty swallowing and ate well. There is no history of pica. There was never any difficulty with speech. He has always been manifestly right handed. Bladder control was achieved at two years of age and bowel control at about the same age. Toilet training usually terminated every meal and so there wasn't any difficulty. He is said to prefer to play with older boys. He seems solicitous of younger children and wants to take care of them. He is said to be an extrovert, likes to watch TV and can sit through movies. He likes to play all sorts of games. At the moment he is fond of guns; it used to be cars. He likes to be read to and is able to ride a two wheel bicycle. He can feed himself, zip zippers--mother says she avoids anything with buttons to make it easier for him. He can tie his own shoe laces. He is able to bathe himself. He will avoid fighting as much as possible and although he doesn't overt temper tantrums he cries when frustrated.

Additional information:

When C-2-3 was in a private school, the mother requested a study and evaluation of her son "because of lack of speech".

At home, C-2-3 was said to be a behavior problem caused by indulgence after a diagnosis of brain damage was made. The mother described her disciplinary methods as "wishy-washy" and without strength. He is small for his age, is a feeding problem but is able to care for other needs. The parents seem to be struggling with and are having difficulty in accepting the patient's limitations.

The mother said that she was a spoiled child, one of two children, the other a brother eight years younger who was a "tyrant". She has difficulties in the area of interpersonal relationships which seem to stem from underlying hostility. She formerly taught school and recently undertook private tutoring and became active in civic work to compensate her husband's absence from the home. She indicated that there has been some friction in the marital relationship from the time of her first pregnancy. She had not wanted children--"was talked into it"--and was left to care for the children herself. There was one pregnancy between the two children. The second child was planned for after the father agreed to spend more time at home.

Medical Summary of Another Physician:

C-2-3 has been under private neurological care since his second year of life. The presenting signs of brain damage were "staring spells" and EEG studies confirmed the diagnosis of organic difficulty.

Physically, C-2-3 is a small, eight-and-a-half year old boy with slightly prominent ears. X-ray of the wrists reveals slight retardation in bone age. Neurological exam within normal limits. Psychological evaluation mentioned on this same report favored organic brain damage.

Physical Examination: Blood pressure 90/60

There was no difficulty in getting C-2-3 to come along with the Examiner. Throughout the entire examination he was very active and seemed all wound up. He verbalized quite easily. He knew his age, said he liked school and he was quite curious about the various objects in the room and was able to identify most of the more common ones. His three wishes were: (1) horse (2) sun (3) a pear tree, because he could pick off the pears and eat them. The child was noted to have a liquid "l" in his speech. A good mommie is somebody who takes care of you. A good daddy is fairly nice. A bad daddy doesn't like you very much. When somebody doesn't like someone he socks them in the jaw. To be liked means not to be mean. Not to be liked means he threw a rock. His spontaneous conversation and rambling seemed to consist a great deal about firemen and policemen, about fires, sleeping and closets for twenty-four hours a day. In response to the ambulance question he said somebody would get hurt, maybe a neighbor, maybe the home was on fire. It is interesting to note that C-2-3 was dressed in a fancy T-shirt and that his trousers had neither belt nor buttons, but elastic at the waist and clips in front. However he was able to tie his shoes. He expressed concern about his T-shirt not being put on correctly after the examination. When asked why, he said it would look silly.

General Appearance: C-2-3 is a pleasant, short, slight-of-build, boy. A very fine but prominent hirsutism was noted on the extremities and thorax. Skin and mucous membranes: not remarkable. Lymph nodes: occasional cervical lymph nodes. Head: the head was of normal shape and size and freely movable. Face: the expression on the child's face was rather alert. He seemed to breathe with his mouth open and spoke with a stuffy nose as if he had a cold. He had good facial control and no tic was apparent. Ears: there were no discharges or mastoid tendernesses. His hearing was grossly normal, and otoscopic examination was negative. Eyes: the extra-ocular movements were normal, there was no strabismus, the pupils were equal and round, reacted to light and accommodation. Gross vision was normal. Fundiscopic examination was normal. Nose and sinuses: the nares were not entirely patent. The mucous membrane seemed rather boggy and pale. Mouth and throat: the teeth were in good condition and numbered twelve on top and twelve on bottom. The tongue did not tremble nor deviate when protruded. There appeared to be a prognathism. The palate and uvula were normal. The tonsils were of normal size. Neck: the neck was freely movable, no masses palpable, the thyroid was not enlarged, the trachea was in the midline. Chest: the rib cage was rather prominent, the chest was symmetrical, the lungs were clear to palpation, percussion and auscultation. The heart size was normal clinically. P.M.I. was in the fifth interspace in the mid-clavicular line on the left. No murmurs were audible. Radial and femoral pulses were easily palpable. Abdomen: contour was scaphoid. No tenderness, no spasm, liver, spleen and kidneys were not enlarged, bladder was not distended and no masses were palpable. Genitalia: testicles were in the scrotum, remainder of genital examination was negative. Extremities: there were no deformities, muscle power and range of motion was good. There was no cyanosis or clubbing of the digits. Neurological examination: not remarkable.

Neurological Examination:

Cranial Nerves--the first cranial nerve was not tested. Second cranial nerve--visual fields were grossly intact. The fundi were normal. Third, fourth and sixth cranial nerves--extra-ocular movements were intact. No nystagmus was present. Fifth cranial nerve--motor and sensory parts were normal. Seventh cranial nerve--muscles of facial expression were all in excellent shape. Eight cranial nerve--boy was able to hear the tuning fork bilaterally. Air conduction was greater than bone conduction. Ninth and tenth cranial nerves--swallowing was well performed. The uvula was in the midline. Gag reflexes were not attempted. Twelfth cranial nerve--the tongue protruded in the midline. No sign of atrophy of fasciculation.

Sensory--pin prick, vibratory, position, two point discrimination, pin prick localization were all well performed once the patient understood what was expected of him. Stereognosis was normal bilaterally. Motor--the boy shows good strength throughout. The muscle tone is normal. Reflexes were equal and active bilaterally. There were no Babinski present. Cerebellar--finger-to-nose, finger-to-nose-to-finger, heel-to-shin tests were well performed. Diadochocinesis was normal. Coordination seemed to be fairly good, although he had some difficulty with rapid alternating movements of the hands, tending to have large gross movements rather than fine movements. He was unable to spin the jack with the left hand, however, he could do a moderately fair job with the right hand. Hand patting tests were normal. Station and gait: the gait was normal. He was able to walk on the heels and on the toes without any difficulty. Romberg was negative.

Comment: It is the impression of the Examiner that he is capable of doing far more than he really wants to do unless he is persuaded to. He was quick to point out that I could spin the jack better than he because of the fact that I'd had more practice. I said that that had nothing to do with it, hat it was up to him to go ahead and try. Once he was challenged he went ahead and did the job pretty well. I praised him and he seemed to enjoy doing the things after that.

Electroencephalogram: Attitude and condition of patient: alert, co-operative. Fundamental frequency: 9 per second waves are scattered in short sequences throughout the record. Slow waves: 4 to 6 per second activity dominates the record, sometimes this slow activity is more prominent over the left acciput. Fast waves: around 20 and 22 per second waves are increased in amount over each frontal region. Amplitude characteristics: high voltage (120 microvolts); irregular modulation. Additional characteristics: no paroxysmal activity is observed in the record. Hyperventilation: generates high voltage 2.5 per second activity in all leads, persists long after the cessation of deep breathing. Impression: generalized abnormal electroencephalogram.

Speech and Hearing Evaluation:

Speech and Language Development: there is no family history of hearing or speech problems. The child's mother has read Gesell and had constantly checked his development by a baby book she kept. According to the mother's recounting and documented by the baby book, the child had precocious language and speech development. She claims that he was saying "Hi, Daddy" and "all gone" by six to eight months of age. At twenty two months she had tabulated his vocabulary of some four hundred words and a few sentences. She comments that both she and the nursery teacher were aware that he had a short attention span. It was felt that he now has vocabulary that is up to his age level and can express his ideas quite well. He had to have some help in organizing his ideas around a topic.

General Behavior: although this child charged down to the examining room as though he was not going to be led any place, he was pleasant and cooperated quite well. He was easily distracted and tended to wander around the room but could be brought back to the task at hand. Occasionally he tended to perseverate on something that had been done in the past.

Oral Examination: oral examination is unimpressive. There is a good deal of pharyngeal closure. There is an overbit. This child has good control of his tongue and uses it well in articulation.

Voice: he tends to talk rapidly and with somewhat of a monotone.

Articulation: this child can articulate all sounds accurately and wit precision in imitation. There are no outstanding articulation errors.

Propositional Speech: this youngster talks volubly. His speech become slurred in conversation because of his rapid articulation. However, this spee is quite typical of many boys his age. He is using complex sentences and has good vocabulary range. He could not be persuaded to tell a story about a picture.

Hearing: this child has normal hearing. He gave quick, accurate responses to the Puretone test. He gave sharp, quick responses to spondee words and the PBK words.

Diagnostic Impression: speech is rapid and slurred but is not unusual.

Psychiatric Evaluation: C-2-3's muscular coordination was excellent, although he had a bad habit of knocking the toes of one foot against the heel of the other as he walked. On entering the playroom, he immediately picked up a gun, shot down all the people figures in the house and turned over all the furniture. He had the husband and wife hitting each other, the children hitting one another, but no children hitting the family. In connection with this activity he gave Bobo the Clown a hard punch but left him alone after that. When asked what he did when people didn't like him, the child responded "I sock them, that's what". He went on to say "I don't hit my brother though, he's too big for me". (his brother is much younger.) When asked about other brothers and sisters, the reply was "we have two children, that's all we intend to have".

As he was modeling a corral fence he named a classmate and asked whether the Examiner knew him. "I have a score to settle with him, he calls me Mr. Monkey and I call him Mr. Stupid." The Examiner replied that we only tease people we like and that she bet he and the classmate he named were good friends. He continued to deny this fact in the interview but the record states that he and this boy are good friends.

As he worked the Plasticene onto the existing metal fence he pounded extremely hard with the butt end of a gun deriving real satisfaction from the activity. "Yes, it's very nice--I can make as much noise as I wish." After about ten minutes of this, which rounded out the first half hour, he had calmed down considerably as fare as hyperactive movements were concerned.

The discussion showed that the child had social maturity. "I did something not so good the other day, I laughted at a midget. Mother and I talked it over and I saw where I had hurt his feelings". . ."People say I'm tricky, I guess I am but I don't mean to hurt anybody really". He had three wishes; horse, two six-guns, and lastly, "a new father, mother, brother and sister--at times." The phrase "at times" was first spoken by the interviewer.

There were occasional nightmares but none could be remembered on this occasion. He did speak of how he liked to take riding lessons and mentioned that, in general, he liked school but "sometimes I don't care for it."

General information was fairly average. On the other hand there are some basic facts which he was unable to give me today, such as the days of the weeks, or the months which appear in the spring season. He glowed with pleasure when praised for a correct answer.

Comment: This youngster showed considerable hyperactivity and agressive behavior during the first half of the interview. His intellectual achievement is spotty but his social maturity rather average.

Psychiatric Re-Evaluation: C-2-3 entered the playroom quickly and happily. He was anxious to point out articles that had been here before and immediately took the gun and began shooting people as well as furniture in the doll house. In order to direct his attention away from this activity, the Examiner nodded towards the Bobo's replacement, the boxer, saying, "how about this for a change?" The child immediately went at the rubber balloon and hit it with both arms though with better coordination in his right hand punch. Although his initial activity on both interviews was to shoot down the people, during the present session there was less hostility shown. He omitted having the husband and wife as well as the children hit each other.

His first two wishes remained the same, i.e., to have a horse and to own some real guns. He refrained this time from wanting "a new father, mother and sister at times" and wised instead that he could be allowed by the policeman to shoot his B-B gun anywhere and not just at the Boys' Club.

When the child was asked to draw a picture, he wanted to use both of his hands; the left hand for the left hand side of his body and the right hand for his counterpart. Also he wished to use the right hand to guide the left. He completed one drawing with his left hand and followed this with a drawing with his right hand and then did a drawing with both hands. He then wrote his name feeling very pleased with himself that it did not have to be printed this year. The other picture on the paper is that of a dog. The drawing made with the use of both hands is the best integrated, though they were all disproportionate. In every case there were five fingers and five toes, ears, hair and all the facial features. As he was making the drawings, he commented "I'll never in the world know what the difference is between woman and boys, I don't believe I'll ever know. . . girls look different than boys when they have all their clothes off."

Conversation with mother: C-2-3's mother felt that when a new drug was added to the regular medication he was "worse off than they had ever seen him." She said, when the new medicine was discontinued, he began to settle down and has". . . matured tremendously since. . ." He has been able to accept responsibility for morning routine in terms of getting off to school and has not "buckled" under the addition of bed making and picking up his clothes in recent weeks.

There appears to be a difficult relationship between this child and his brother who is three years younger and seems to be gifted. His brother is anxious to give the answers to questions addressed to C-2-3. Also, his brother cannot understand why C-2-3 is slow in arithmetic which is "so easy". This parent is a very concerned and interested mother who has considerable intellectual ability.

The child's mother feels that he is better accepted by the group now because he has developed a better concept of the games and hence has not tended to muddle them up in his effort to be friendly.

The value of Bobo the Clown was stressed, and if Bobo was ordered, it was recommended that his activity with the bag should be structured so as not to wear the child out, but while he was at it let there be no "holds barred."

The possible implication of the child's remark concerning the difference between boys and women were discussed. It was learned that he is quite aware of the relationships. He said to his mother, "I know that you love me Mommy but my Daddy doesn't love me the way he loves you, I'm not so sure about him."

Comment: The child has begun to develop inner control but still reflects marked anxiety secondary to his convulsive and perceptual difficulties. He is further anxious because of the incrasingly obvious discrepancy between his own ability and that of this younger brother.

Stanford-Binet, Form L (pre-test) (4-3-57)

C.A.: 9--7
M.A.: 8--2
I.Q.: 85

Present intellectual functioning falls within the Slow Learning range. The mental age is 8--2, and I.Q. is 85. Previous tests have ranged from I.Q.'s of 95 to 78. It is important to note that the highest I.Q., that of 95, was obtained in 1952 when S was five years old. As S has grown older the obtained I.Q.'s have been quite consistent. If only the test results obtained in 1955, 1956, and 1957 are compared, the I.Q. range is only seven points. It is the earliest test results, obtained at an age when the I.Q. is typically least stable, that appears to be most out of line.

The Basal Age, at which all items were passed, was at Year VIII, while he Ceiling, at which all items were failed, was at Year XI.

The scattering in this test is rather peculiar. No items at Year IX ere passed, but vocabulary was passed at Year X. Vocabulary is thus almost wo years above the mental age.

tanford-Binet, Form M (Post-test) (6-9-58)

.A.: 10--9
.A.: 7--6
.Q.: 70

The I.Q. obtained on this test was fifteen points lower than the preest I.Q., which places the intelligence within the Retarded range. The range f performance is from a Basal Age at Year VII to a Ceiling at Year IX.

Three items were passed at the Year VIII. Comprehension of problem ituations was quite good, as was seeing opposite analogies. He was also able o name the days of the week by rote, as well as telling the days that come efore certain specified days. More involved abstract tasks, such as verbal bsurdities and similarities of two things, proved too difficult.

All items were failed at Year IX. Memory for designs was very poor, nd S could not tell the similarities of two things, although he was able to ee differences. He could not repeat four digits reversed, but could reverse hree digits. In giving rhymes he gave a series of words beginning with the ame sound, "d". The directions were carefully repeated, and he then gave a eries of words beginning with "h".

Ammons Full-Range Picture Vocabulary Test (7-19-57)

C.A.: 9--10
M.A.: 10--0

The mental age on this test is considerably higher than that obtained on the Stanford-Binet. The following words, which the average child of this chronological age can pass, were failed by S: vegetable, sale, garment, perspiration, protection, and cleanliness.

Goodenough Intelligence Test:

Pre-test (4-3-57)	Post-test (5-12-58)
C.A.: 9--7	C.A.: 10--8
M.A.: 8--0	M.A.: 7--9

The mental ages obtained on these tests were both quite close to the Stanford-Binet mental ages, the post-test being lower than the pre-test in both cases. The first drawing is a robot-like figure, with box-body, square arms outstretched, and square head. The post-test figure has considerably more detail, but is more crudely drawn. The figure is wearing eye glasses, has outstretched arms with fingers carefully arranged around the circumference at the end, and club-like feet with the correct number of toes arranged around them almost up to the knees.

Block Design and Coding from WISC

	Raw Score	Scaled Score	Equivalent Test Age
Block Design	5	6	6--6
Coding	24	8	7-10

Design A was completed on the first attempt, Design B on the second, and Design C on the first. On Design 1, S chose the correct blocks, but could not arrange them correctly. On the Coding test, Form B, twenty-four symbol substitutions were attempted, with no errors.

Bender Gestalt Test

On the pre-test (4-3-57) there were twenty-two errors, with three immature, three perseverations, three dissociations, three incorrect elements, one unrecognizable, three distorted angles, three compressions, and three enlargements. There were only ten errors on the post-test (5-13-58) with one concrete, one perseveration, three dissociations, three incorrect elements, two distorted angles. Improvement is mainly seen in fewer immature drawings, less perseveration, and fewer compressions and enlargements.

Syracuse Visual Figure Background Test

Pre-test (10-24-57) there were three correct figure responses, one background response, and two perseverations. Post-test there were seven correct figure responses, no background responses, and three perseverations. Thus improvement is seen in increased accuracy and reduction of background reactions.

Tactual Motor Test (10-24-57)

S did not draw the correct figure for any of the designs presented. For the triangle, with plain background, he drew a square. When a thumbtack background was added, he drew incorrect figures enclosed in a square.

Marble Board Test (10-1-57)

S was unable to construct the design for Marble Board 1, even though he took much time and made many changes of the marbles. His drawing shows the basic pattern, but there is a marked disproportion in the sizes of the overlapping squares. After many shifts he managed to construct the design for Marble Board 2. His drawing, again, shows disproportion and dissociation of the design, but is readily recognizable.

Vineland Social Maturity Scale

Pre-test (11-19-57)		Post-test (5-16-58)	
otal Score:	76	Total Score:	73
ge Equivalent	9-7	Age Equivalent:	8-10
ocial Quotient:	94	Social Quotient:	83

The mother, who served as informant for both interviews, expressed oncern with the increased medications S is getting, and feels that it is lowing him down very much. The main skill which S is not displaying now, nd which he was at the beginning of the project, is in making telephone calls. is teacher last year made this activity part of the regular school program, ut he has not continued calling class mates this year.

ummary:

Periodic intelligence tests over the past five years have shown a teadily decreasing I.Q., with a high of 95 in 1952 to the present low obtaind in 1958 of 70. The main intellectual strength of this child is vocabulary, ut when faced with abstract tasks such as similarities and problem situations, is performance is very poor. Visuo-motor performance is also well below age evel.

S showed improvement on two of the five tests on which there are prend post-test results for comparative purposes. On the Bender Gestalt Test e produced fewer errors, as seen in fewer immature drawings, less perseveraion, and less compression and enlargement. Improvement is seen in accuracy nd reduction of background disturbances on the Syracuse Visual Figure Backround Test. The Stanford-Binet, Goodenough Intelligence Test, and Vineland cale of Social Maturity all show a reduced level of performance. The mother ad indicated the very strong possibility that an extremely heavy medication or the control of seizures may be retarding overall development and efficiency.

PEDIATRIC HISTORY: C-2-4

The information was obtained from the mother who is a pleasant looking, modestly dressed woman who spoke with a foreign accent, having been born and raised outside of the U. S. She seemed to be under a great deal of tension in discussing C-2-4's problems and with understanding coaxing, did give most of the information desired.

Problem:

C-2-4 is said to be nervous. This nervousness manifests itself in ringing his hands when put under any pressure. The mother was unable to elucidate any further and I did not want to press the point at that time. This nervousness might be attributed to a prenatal factor, or so the mother said. She explained that about two or three weeks before C-2-4 was born she fell from a table and following this she was very upset and unsteady and unsure of her gait and on one or two occasions was afraid of slipping and falling again. C-2-4 was born with his eyes crossed, which remained so for a long period of time and the basis of this, the mother felt perhaps the fall might have had something to do with it. There were no particular ill-effects following her fall. She was confined to bed but more for nervousness than for any physical reason. There was no spotting or premature rupture of the bag of water. The fall apparently did not bring on labor. If anything, C-2-4 was said to have been born a little later than had been anticipated. With a prompting, the mother added that the teachers tell her that C-2-4 has a mind of his own because he doesn't obey too easily and therefore creates a problem in school. He is said to get along fairly well with the children unless there are too many of them or they try to boss him or tell him what to do. Presently,he is in regular school and is to be placed in the second grade next year. Actually, he had been scheduled for Special Education classes but apparently a place could not be found for him until now.

Sometimes when he is asked to do something he ignores the question or the request almost as if he might have some trouble hearing. This apparently seems to be getting worse. The mother did add, however, that maybe this just is his way of ignoring the question, or perhaps he is so preoccupied with other things that he isn't paying enough attention.

Again when asked directly about any speech difficulty, the mother said that he did have some speech difficulty; however, this is getting better. When asked specifically what the speech difficulty consisted of, she said that C-2-4 used to stutter and would leave off prefixes or suffixes from words.

In summary, she said that except for the speech problem, prior to his going to school, she didn't think there was anything remarkable about his behavior. As a matter of fact, his two older brothers were pretty much the same in general, and they too had stuttering problems with speech. They apparently have gotten over these difficulties and are doing fairly well in school

Family History:

1. Mother's mother died at the age of thirty-five of Tuberculosis.

2. Mother's father died at the age of forty-eight of a kidney ailment.
3. Father's mother is fifty-six years of age and well.
4. Father's father is living and well although he is not living with his wife. They apparently separated when his father was a youngster.
5. Mother has three brothers and two sisters all of whom are living and well.
6. Father has two sisters who are living and well.

The mother's mother, grandmother and aunt all had nervous breakdowns. The difficulty seemed to have stemmed from marital difficulties and other difficulties with children and home. All three were institutionalized and the grandmother and aunt actually died in the institutions.

Family History:

Father: thirty-six years of age and in good health. His occupation is that of a printer. He finished school through the ninth grade. Although he was born in another state, he has lived in the area most of his life.

Interests: archery, hunting, fishing and sports in general.

Problems: had difficulty in school as a child and so he quit at the ninth grade. He apparently didn't like school. His mother and father separated when he was about four or five. His mother remarried when he was five or six and apparently he got along fairly well with his stepfather.

Personality: he is said to be well liked and friendly. This was all the mother had to say on that score.

Attitude toward patients's difficulties: apparently he feels that the mother should leave C-2-4 alone and not punish him as much and not keep after him as much.

Mother: thirty-three years of age, (she actually looks quite a bit older than this) and in good health. She was born outside of the U. S. and has been in this country for the last thirteen years. She too finished school through the ninth grade.

Interests: homemaking and volunteer work.

Problems: she was very shy as a girl. When asked specifically she aid she didn't remember too much about her mother's breakdown as well as her randmother's and aunt's, except that she remembered an unpleasant experience f visiting them in an institution. Her mother remained home under care of private physician and a nurse. This, plus the fact that her father apparenly did a good deal of drinking, made her "nervous".

Personality: she said she likes everybody and couldn't say anything more about her own personality.

Attitude: the mother at this point broke out into tears and it took a little bit of time before she could compose herself to continue. Afterward, all she could say is that she felt he could be helped and is very much concerned about him. When asked what it was she was concerned about, she said that his behavior, like throwing stones at people or cars or misbehaving in general, is what is causing her some concern.

Marriage: the parents have been married for fourteen years. They met and were married in the wife's homeland while the husband was in the Navy. He was twenty-two years of age and she was eighteen years of age. It was the first marriage for both. They are of different religions. Apparently this doesn't cause any outward difficulties and the children are being raised in the mother's faith. The marriage was described as average and it was further stated that the father is not in the home too much as he works long and irregular hours. As a result of this the mother said that she has the job of taking care of the house and raising the children. She has never been back to her homeland and did not express a desire to do so.

Because of the peculiar and long hours that the father worked, he is home very little of the time and so can not be with the boys as much as the mother would like. Apparently, more recently, his hours are much better and he does spend quite a bit of time with the boys, taking them fishing and hunting and taking them out to the archery range for bow and arrow practice.

Siblings: a) sister, thirteen-and-a-half years of age, doing average work in school. Seems to get along fine with the other children and with C-2-4. b) brother, ten-and-a-half years of age. He is said to be a little slow in school. He too had a speech problem which is OK now. He and C-2-4 will tease and fight "like brothers." They always play together. c) brother, nine-and-a-half years of age. He too is said to be a slow reader, otherwise doing OK. He also had a speech problem for awhile. C-2-4 will play equally well with both of these brothers and seems to show no preference for either. The boys sleep in the same room, either in a bed together or in separate beds, depending on what is happening at the time. d) sister, twenty-two months old "a ball of dynamite", very active. f) brother, three months old and doing wel

In addition the children have a dog who is not anyone's in particular but belongs to and is enjoyed by everybody.

Mother's history during the pregnancy:

There is no history of miscarriages or still-births. The mother was twenty-five years of age at the time she delivered C-2-4. She was being cared for by a Health Department Clinic and she gave birth at a local hospital. The pregnancy was a desired one and apparently was uneventful up until the time when she fell from the table, two or three weeks before term. Following this, as previously stated, she became nervous and jittery and would have to go to bed on and off. She received no medication during the pregnancy and had no x-rays.

The labor and delivery itself was not remarkable. The mother said she doesn't remember very much of either except that it did not take very long.

C-2-4 weighed six pounds, four ounces at birth, was seen within the first twenty-four hours and both mother and infant left the hospital together. He was nursed for the first two weeks. However, because he didn't seem to be getting enough, and because he was seen to be hungry all the time, he was placed on bottle feedings. All the other children were nursed also for about three weeks, apparently the mother always having some difficulty with her milk.

Past History of Patient:

DPT and smallpox vaccination during the first year of life. C-2-4 has had two Salk vaccine immunizations. German measles at the age of three or four, chickenpox at the age of four or five. He had a history of repeated attacks of sore throat and ear infections so that, at the age of six, he had a T & A at the County General Hospital. C-2-4 himself has never had any convulsions, although his youngest sister had convulsions last year and currently is on Phenobarb. C-2-4 is on no medication at the present time. The crossed eyes which the mother described as being present from birth, apparently has straightened itself out and at the present time he is not wearing any glasses nor has he ever.

Developmental History:

C-2-4 had no trouble feeding or swallowing although he did a great deal of crying for the first six months of his life. There were no sleeping problems. Solids were started at the age of three or four months. He was weaned at about two years of age by himself when he gave up the bottle. The bottles were always propped up until that time. He would also pick up sand and dirt and put it into his mouth. Toilet training was accomplished by about two years of age without any difficulty by himself and occasionally there is an episode of enuresis. The mother explained that this is when he drinkis a lot before going to bed. He is said to be right-handed and there are no left-handed individuals in the family. His motor development was said to have been not remarkable. There is no thumbsucking, head-banging or rocking. Speech did not appear until about eighteen months of age and then there was the difficulty already mentioned. There is a question of visual difficulty as well as some hearing impairment.

Present Status:

C-2-4 prefers to play with other children rather than be by himself. Usually the children are older. He seems to get into fights with the younger children. He likes to play with little toys, cars, and can't do puzzles too well. He likes to play with blocks but as yet hasn't been exposed to an Erector set. He likes to color and colors well. He is said to be able to print OK. He is a slow reader, is able to ride a two-wheeler bicycle, sits and watches his favorite programs on television. He had been going to Sunday school but was unable to make Communion this year. He used to have nightmares in which he would cry out and would be found awake in bed crying. There are times when he likes to go to school and other times when apparently he says he doesn't want to go back. He has been making progress in school, especially this last year. He is said to be unable to button the buttons on his cuffs but is able to tie his shoes and button other buttons. He is said not to be able to use a knife too well, and he behaves fairly well at the table. Ther is no difficulty in getting him to sleep.

Personality: he is said to be very likeable, wants attention all th time. When punished, like being sent to his room or withholding things like TV or occasionally being hit, he "throws a fit" stamps his feet and gives back-talk. There apparently is some disagreement between the parents on the question of punishment.

Fighting: C-2-4 knows how to fight and will fight to protect himsel

Frustration: when frustrated, he has an actual temper tantrum, although not on the floor, but in his bed.

Physical Examination:

General Appearance: C-2-4 is a rather slight youngster who came with the Examiner without hesitation. He is pleasant looking and has a winning smile. At the outset there was no obvious speech difficulty nor any hesitat in talking. He knew his age. Said he goes to school and is in the first gra He was unable to identify a quarter, although he knew a penny and a nickel, but he didn't know how many pennies there are in a nickel and was unable to give the days of the week in sequence. He seemed a little fidgety, moving h legs and hands a bit. When asked would he like to write or draw, he picked the pencil up in his right hand and drew a picture of a mouse and a deer. Although he held the pencil fairly well, it was noteworthy that his left han remained in his lap, immobile, not even holding the paper (almost as though was trying to suppress its use).

Following the drawing of a deer, he spoke about hunting, said that h brother shot a rabbit, but they couldn't eat it because it was "all dirty an bleedy." When asked about dreams, he spoke about throwing the rabbit, that had previously been referred to, into a tree and it was at this point that t first stutter response appeared. As he continued talking about the dreams t stutter response appeared. As he continued talking about the dreams the stu ering became more pronounced and obvious. Bad dreams were about his brother shooting things. At this point, the speech became even more immature and indistinct, and ended with a sort of half-laugh. Although he was unable to sa what a good mommy or a bad mommy was, or a good father, he said a bad father "is someone going around and being mad.: To the ambulance story he said "my little sister had a convulsion and that was why the ambulance was there".

In getting undressed, it was noted that he took his left shoe off first, then he took his right sock off, and took the left trouser leg off first. In getting dressed, he used the same sequence, in terms of right and left, for the various things mentioned. Though he was able to hop on either foot, he was unable to skip but he walked pretty well on both heels and toes The gait was normal, he did not deviate to any side, even when standing on on foot. His eyelashes were very long, his teeth were in good condition but poorly aligned and numbered twelve on top and twelve on bottom. His hearing

eemed to be grossly normal. Reflexes were physiologic bilaterally and there
s a very mild right convergent strabusmus. In getting dressed, he was able
tie his shoes but in putting his shirt on he put his right sleeve on first
d left both cuffs unbuttoned. When told about this he was able to button
e right one, using the left hand; however, the left one which required the
e of his right hand, he was unable to do and the Examiner had to do this
r him. The remainder of the physical examination was not too remarkable.

urological Examination: Cranial Nerves: First cranial nerve was
t tested. Second cranial nerve: Fundi are normal. Visual fields seem to
intact. Third, fourth and sixth cranial nerves: The extraocular move-
nts are intact. The pupils reacted to light and accommodation. No signs
strabismus or nystagmus. Fifth cranial nerve: Corneal reflexes are equal
d active. Motor and sensory powers of this particular nerve are normal.
venth cranial nerve: Muscles of facial expression are both normal. Eighth
anial nerve: Air conduction is greater than bone conduction. The boy was
le to hear the tuning fork without difficulty. He is able to hear the
ispered voice without difficulty. Ninth and tenth cranial nerves: The uvula
nt up in the mid-line. The boy was able to swallow without difficulty.
eventh cranial nerve: The boy was able to shrug his shoulders and turn his
ad from side to side against pressure without difficulty. Twelfth cranial
rve: The tongue protrudes in the mid-line. Sensory: Pin prick, vibratory,
uch, position and stereognosis are all well performed. Two point discrimina-
on, pin prick localization, double simultaneous stimulation on both arms,
ft arm and left face, right arm and right face, both legs, are normal.
flexes: Reflexes are equal and active throughout. No pathological reflexes
e present. Motor: Motor strength is good throughout. Muscle tone is normal.
rebellar: Finger-to-nose and heel-to-shin tests were well performed. Diad-
hocinesis is normal. The boy was able to spin the jack better with the left
nd than with the right. Station and gait: The boy was able to walk on his
els and on his toes without difficulty. Romberg is negative. Comment: The
y is left-eyed and right-handed. The diamond he drew is completely normal.
rthermore, in examining the house that he drew, he seemed to do very well.
was able to write his name without difficulty. He was unable to read a
gn which said "How We Read". He was able to spell all the letters out but
could not put them together and make out any sense.

Electroencephalogram: Attitude and condition of patient: alert, co-
erative Fundamental frequency: ranges between 8 and 9 waves per second.
ow waves: 4 and 5 per second activity is fairly prominent in the homologous
st-rolandic derivations. Fast waves: are not prominent. Amplitude charac-
ristics: average to high voltage (100 microvolts); irregular modulation.
ditional feature: no paroxysmal activity is recognized. Hyperventilation:
derately accentuates the generalized slow wave output. Impression: Moderate
neralized Abnormal EEG.

eech and Hearing Evaluation:

Language and Speech Development: The mother speaks with an accent,
she was born and raised outside the United States. She states that the
ly time her mother tongue is spoken in the home is when her sister comes to

visit. This is very rare. None of her children have learned to speak any language other than English.

Mother is greatly concerned about C-2-4's hearing. She thinks his greatest difficulty is in following instruction. She finds it necessary to tell him two or three times if she wants him to do something. This is true even if it is something in which he is interested. She expresses this as giving her a feeling as though he shuts her out. This youngster had frequent earaches until a T & A which was done two years ago.

C-2-4 is reported to have babbled normally as a young infant. He was the slowest of the children in starting to talk. She does not remember when he said his first word. However, she is sure he was beginning to use two word phrases by twenty-four months of age. His speech, as it developed, was not different from the others. She reports that his vocabulary and language have been expanding since he has gone to school. She estimates that his vocabulary is about a year behind his age level. He apparently has a number of words which he mispronounces and which are very difficult to correct. She gives as an example; he says "afore" for before. He has always liked to be read to and has enjoyed thumbing through magazines and books since he was a little boy

She does not think he is more of a behavior problem than the other children. When he gets angry he hits out. She is aware of this fact when he is watching the two year old baby and is very quick to "discipline." He watches everything she does and seemingly delights in the opportunity "to smack her". This was particularly interesting in light of the fact that the only real stutter block that was observed here today was when we talked about the baby sister.

Behavioral Observations: C-2-4 is a slender child with a very sensitive face. He came along willingly with the Examiner and talked almost constantly. He was most cooperative and apparently enjoyed the experience.

Oral Examination: There is rather a high palate with a velum of adequate length and lift. There is slight overbite and front teeth are widely spaced. There is adequate control of the tongue and lips.

Articulation: Articulation on isolated words is good, except for th - f substitution.

Voice: Voice is very tentative and has a breathy quality because it is unsupported.

Propositional Speech: C-2-4 talked on and on without any prodding from the Examiner. As a matter of fact he initiated the conversation with a discussion about a Halloween party which he had attended. He wanted advice as to how he should dress up this year - whether he should be a Hobo or an Indian. While talking he exhibited many nervous mannerisms. His phrases were punctuated by audible intakes of air and frequently he talked on the ingoing breath stream. His speech is filled with many circumlocations and filler. He will repeat words and phrases intersperced with "you know" and "uh, uh."

His vocabulary and language usage was better than had been anticipated from the discussion with his mother. The only grammatical errors that were observed were concerned with verbs, as he used "shotted" for shot, and "I seen". More cluttering was heard than stuttering. As a matter of fact, the only evidence of a stutter was when he talked about his baby sister.

When presented with a page of animals he made an adequate comment about each one and named the entire series. Rather than telling a story about each picture, he described what he saw. This was limited to one or two sentences about each of the three pictures. He was somewhat reluctant to tell the story of the Three Bears. He started out in a very tentative, insecure fashion. He finally got wound up and told the story amidst constant giggles. When asked to repeat a fairly long sentence, he appeared to have real trouble, indicating some difficulty in auditory perceptual organization.

Hearing: This child has a normal end organ of hearing. He had no difficulty in giving quick, accurate responses to the test by puretone audiometry. The following puretone audiogram was obtained:

Right	10	15	5	-5	-5	-5
	125	250	500	1000	2000	4000
	10	10	0	-5	5	-5

He repeated to spondee words quickly and accurately at very soft levels. He missed one word on the PBK list, for a score of 96%. Any difficulties with hearing are a matter of inattention or difficulties in organizing complex material.

In summary, this Examiner felt that C-2-4 was a nervous, insecure child whose speech reveals more of a clutter than a stutter. He is verbose but poorly organized in his output.

Psychiatric Evaluation: This wiry, well-developed youngster gave his age correctly as eight. He came willingly to the playroom, showing normal gait and good muscular strength.

He looked around the playroom with obvious pleasure but his first activity reflected the need to establish a foothold. He lined up all the trucks he could find (in the course of which he was discovering what toys were there to be played with). He made a point of saying he had no trucks at home now, but that he once had). He asked the Examiner what she did and when she replied that she played with boys and girls so as to learn and help them with some of their worries, he replied "Oh". He denied worries - "especially my father, he doesn't have worries". At this, his eyes gleamed. Further evidence for a good identification with father is evidenced by his desire to have the same job as the father when he grows up.

We played a card game called War. He abided pretty faithfully to the rules he had already laid down, but seemed to lose himself in each particular step and was not able to stick to the original objective of the game. Handling of the cards revealed clumsiness of fine movement, but not overly significant in his age group. When introduced to Bobo the Clown and the punching bag, it was clear, however, that he was somewhat awkward in gross coordination also. He tended to push out from his chest to the object rather than developing a good swing of the arm. However,he hit with obvious pleasure and satisfaction. He did not use his left hand until specifically asked to do so.

On this occasion, the Examiner particularly asked him whether he was holding back his left hand. His reply was a look of genuine surprise and puzzlement at the question. He was apparently not aware when he used a particular hand.

To the Despert Fables, he responded that "the baby bird would fly away", even after the questions, "he didn't go to the mother bird, or the father bird, or to his own nest?" which were offered to make certain he understood the meaning of the story.

He noticed the Play-Do and reached for it, attempting to open it, even as the Examiner had opened one of the cans. This looked like healthy initiative, but he soon saw that the lid would not work and so handed everything over to her. There seemed to be no perseveration. He observed that the material smelled like dough, wondered what he should make, but shortly turned his attention back to Bobo the Clown, which he correctly named by reading the letters on the side.

When asked to draw, he very quickly drew some artistic blue clouds, several buzzards circling over a green field where two young boys stood, each with an oragne hat. They were stick figures and looked more like upright grasshoppers. Nevertheless, C-2-4 seemed quite proud of this picture. He stated his father would kill the buzzards, and that buzzards did not eat anything that wasn't already dead or "suffering". He denied any fear of buzzards

Shortly before the end of the hour C-2-4 asked "Say, do you finger paint?" He was given the equipment and for a few minutes did finger painting, during which he showed exceptionally easy, graceful motions; his whole body became relaxed and expressive. The colors were largely somber. His approach to this activity was different from other children so far seen. He took up several splotches of color out of each jar and placed them close together and then began to finger paint. Other children have taken one color, moved their fingers through and around with it for a while before turning to another color

He seemed loathe to go, and worked in a puzzle which is rather good at catching difficulties with form. He missed some of the more obvious shapes which were very simple because of a solid color distinction. It seemed to bother him that he could not place each piece on the first attempt.

C-2-4 appeared to have good general information about the countryside and animal like, compatible with most eight year olds. However, he did not know his birthday, and seemingly did not care. He was disoriented to time in general. He gave the names and ages of his siblings accurately, putting an extra not of pleasure into his voice when describing his big brother.

The overall emotional picture of C-2-4 reveals a child who operates well on a one-to-one relationship, accepting limits, showing initiative, trying hard to please, even to the extent of answering when he is not altogether sure of the question. There was no observable perseveration and no hyperactivity. However, there was definitely a short attention span and a measure of distractibility. C-2-4 can deal more effectively with concrete and specific activities than with ideas. There is considerable anxiety which is handled by obsessive-compulsive means.

Psychiatric Re-Evaluation: There have been some striking gains in C-2-4's attitude as compared with the last interview. While he had come willingly to the playroom previously, today he was much less anxious and much more willing to engage in spontaneous conversation. In fact, he was quite talkative, stating, "Did you hear about the robbery?" and then giving details about it or "Did you hear about the jet and the plane crash the other day?" He had heard about the news event, it seems, from his older sister.

He was most cheerful and seemed to be having a great deal of fun. His excitement never led him to loose control of himself. He was at all times amenable to suggestions.

Most of the time he spent hitting the replacement of Bobo the Clown and shooting play bullets at various objects on the play table and in the play cupboard. He was thought to have much better coordination and also was able to "let himself go" in the two latter activities to a greater degree than previously.

When asked to draw a person, he drew his fourteen year old sister. He filled in all the details, such as hair, lipstick, fancy dress and high heels. C-2-4 wrote his name clearly and with little difficulty.

There was still some of the stutter which had been noted before - perhaps this should be called stammer - but he was easily understood. When asked about school his eyes lit up and he said "It was very fine". The father accompanied C-2-4 and seemed a very relaxed, sensible, levelheaded individual. He mentioned how he takes his three sons in rotation along with him on the two Sundays a month when he shoots archery and he tried to find time to play with them on the weekends. He feels that C-2-4 has come along and has somewhat greater self-confidence. However, he added that he did not see very much of C-2-4 and could not truthfully say just how much difference there really was.

In the Examiner's mind C-2-4 has gained a degree of self-confidence with a concomitant decrease in anxiety. It would seem that the source of the anxiety is now not primarily academic frustration secondary to perceptual difficulties, as it was in the previous interview.

Stanford-Binet, Form L (pre-test) (7-11-57)

C.A.: 8--5
M.A.: 7--0
I.Q.: 83

Intelligence is within the Slow Learning range, with an I.Q. of 83 and mental age of 7--0. The Basal Age, at which all items were passed, is at Year VI, while the Ceiling, at which all items were failed, is at Year XI.

At Year VII Billy was unable to repeat five digits forwards. He became quite upset at this failure and despite what seemed to be maximum effort only became hopelessly confused. He appeared to hear what was said, but could not organize the stimulus in a manner that wouldhelp retain it. Abstract thinking, as in seeing similarities, was too difficult for him. For example, when asked how wood and coal are alike, he said: "They're dirty." For apple and peach, he said: "Apple has a stem, but a peach has a round thing." For ship and automobile he said: "A car can't go across the ocean." He was unsuccessful in making a good diamond, producing figures with additional angles. He was successful in the differentiations required in seeing the absurdity of situations presented pictorially, and was quick to comprehend the situations described verbally that involve "common sense."

At Year VIII S was unable to repeat from memory a story that was read to him. Again, this would indicate difficulty in perceptual discriminations of auditory stimuli. He seemed to get the over-all sense of the story, but fabricated the details. He could not bring together the intellectually irreconcilable elements of situations described to him. For example, when asked what is foolish about the statement that they found a young man locked in his room with his hands tied behind him and his feet bound together, he said: "He locked himself in. He thinks someone robbed his place!" He could not see the similarities and differences between various common items. For example, when asked how a baseball and orange are alike and how they are different, he said: "Batting a ball." For airplane and kite, he said: "Kite is more hard to do." Further questioning elicited no further information. In attempting to repeat sentences it was again obvious that he had difficulty with organization of the auditory stimulus. For example, in repeating the sentence "Fred asked his father to take him to see the clowns in the circus, 'he said, 'Fred asked his father to bring the circus to the clowns.'" The only item passed at this age level was vocabulary. Eight words are needed to pass, and S correctly defined ten.

At Year IX two items were passed, paper cutting and memory for designs He could not repeat four digits reversed or see the absurdity of situations described verbally. He could not give rhymes, which is usually the easiest task at this level. For example, when asked to give a number that rhymes with tree, he said: "Two." When asked to give the name of an animal that rhymes with fair, he said: "Tiger." He gave the correct answer, however, to the first question giving the name of a color that rhymes with head.

At Year X only one item was passed, picture absurdities. This was the easiest item at this age level for most of the children in the present project

Stanford-Binet, Form M (Post-test) (5-22-58)

C.A.: 9--3
M.A.: 8--0
I.Q.: 86

The I.Q. is three points greater than that obtained at the beginning of the year. The mental age is 8--0, I.Q. 86, and performance range is from Year VIII to Year IX. Intelligence is within the Slow Learning range.

The extremely narrow performance range of two years indicates lack of outstanding strengths or weaknesses. It should be noted, however, that several items were minimal failures, i.e., three verbal absurdities must be correct for success on this item, while S passed two. In attempting to rhyme words he said: "Caps, cat, kitten, cap, taxi driver." He was able to give similarities, but not differences, could not reassemble a dissected sentence, or repeat four digits reversed.

Ammons Full-Range Picture Vocabulary Test (11-27-57)

C.A.: 8--7
M.A.: 7--0

The mental age obtained on this test is exactly the same as that obtained on the pre-test Stanford-Binet. The following words, expected successes at this age level, were failed by S: vegetable, dessert, transport, customer, sale, cheerful,collision, listening, safe, and intersection.

Goodenough Intelligence Test

Pre-test (6-27-57)	Post-test (5-13-58)
C.A.: 8--5	C.A.: 9--2
M.A.: 8--6	M.A.: 9--6

The ratio of mental age to chronological age is practically the same for both drawings. The most outstanding difference between the drawings is the addition of hands to the post-test drawing. Both are fairly well detailed, with hats, belt, shoes with heels, and cuffs.

Block Design and Coding from WISC

	Raw Score	Scaled Score	Equivalent Test Age
Block Design	15-	12	9--6
Coding	15	5	6--6

Designs A, B, and C of the Block Design test were completed accurately and rapidly on the first attempt. Design 3 was completed well within the time limitations. On the Coding test, Form B, seventeen symbol substitutions were attempted with two errors. He seemed to have much difficulty in keeping his place, and performance was extremely slow on this task.

Bender Gestalt Test

On the pre-test (7-11-57) eight errors were made, including one perseveration, one dissociation, two incorrect elements, three distorted angles, and one compression. Post-test (5-13-58) eight errors were again made, including three perseverations, one dissociation, two incorrect elements, and two distorted angles.

Syracuse Visual Figure Background Test

On the pre-test (10-24-57) there were eight correct responses to the figure, one background response, and no perseverations. Post-test (5-14-58) there were eleven correct responses, and no perseverations. The main change on this test is in improvement in accuracy.

Tactual Motor Test (10-24-57)

S was able to draw the triangle, both with plain and with plain and thumbtack backgrounds. Drawings of the other figures, however, were completely unrecognizable.

Marble Board Test (10-1-57)

The first design was accurately reproduced, the method of appoach was continuous, and organization was aggregate. S's drawing was one of the best in the present series, showing a good grasp of the basic configuration.

Marble Board 2 was quite inaccurate, which S recognized, but despite many shifts and changes, he was unable to correct it. The method of approach on this design was incoherent, and organization was aggregate. The drawing shows an hour-glass figure, but is easily recognizable.

Vineland Social Maturity Scale

Pre-test (11-18-57)	Post-test (5-16-58)
Total Score: 7--1	Total Score: 73.5
Age Equivalent:8--3	Age Equivalent: 8-11
Social Quotient: 95	Social Quotient: 96

The mother served as informant at both interviews. Very little change in the rate of social development has occurred over the course of the year, as may be seen in the similar social quotients. S has mastered several skills since the beginning, such as making telephone calls to his friends, dialing the numbers himself and looking them up. He cares for himself at the table, choosing foods and spreading his own bread and butter. He is also entrusted to make minor purchases, which he does satisfactorily.

Summary:

Little change is noted in this child's rate of development, which seems to be very consistent in all areas on which psychological test data is available. Intelligence is within the slow learning range as shown on the Stanford-Binet and Ammons Full-Range Picture Vocabulary Test. The main intellectual weaknesses are in organizing auditory perceptions, abstract ability, and number concepts. Relative strengths are in vocabulary and visual-perceptual discrimination. The Goodenough Intelligence Test gives almost identical results for pre- and post-tests when the ratio of mental age to chronological age is considered. No improvement was noted on the Bender Gestalt Test, the same number of errors being obtained on both tests. There was a slight change toward greater accuracy on the S.V.F.B. test, but the Vineland Social Maturity Scale gives almost identical social quotients. The overall impression is of slow development with few outstanding strengths or weaknesses.

PEDIATRIC HISTORY: C-2-5

C-2-5 is one of twins, both of whom are living in a foster home. The foster mother brought him and supplied whatever information is available in this report. More information is needed and perhaps could be obtained from the agency responsible for him.

Problem:

The problem as stated by the foster mother is that C-2-5 stutters and has ever since he came to her. This has improved a great deal since he started school in Special Education. He apparently has done pretty well this past year.

His attention span and memory are not too good. Teachers indicate that he would need some drilling on this. At home he never forgets and it only took three evenings to teach him the alphabet and he wasn't able to recognize letters afterward. Otherwise he seems very bright. He is obedient and apparently know right from wrong. He writes with his left hand and there was some difficulty getting him to hold a pencil correctly. As previously stated, he is one of twins, the older one. The boys have been living with the foster mother for the past three years. When they arrived she said she couldn't understand anything C-2-5 said. He apparently witnessed his mother's burning to death and for awhile afterward he would talk about this. He has never wanted to go back to his father. His father will come around when he is drunk and make things miserable in general for both the foster parents and the children. Whenever C-2-5 gets upset he stutters. This happened yesterday when he was told about coming in for an examination. The foster mother spoke of the children's needs and feels very strongly about the possibility of her losing them to the father. The children were five years of age when they came to the foster home. C-2-5 is said to be able to dress himself completely. He wasn't toilet trained at that time; however, he is now. He is not messy at the table and is able to use a fork and a spoon although he is not permitted to use a knife. He sleeps OK. He is able to ride a tricycle and he is said to speak well except when upset. He can become upset when he is scolded or when he is speaking to strangers. He plays well with other children. The others seem to like him. He is able to watch funnies and cowboy stories on TV. He is said to color and write fairly well. He is able to count up to one hundred when encouraged and is able to read. As far as the foster mother knows, he has had the measles at the age of seven and a T & A at the age of five. As previously stated, he is left-handed. He doesn't fight, as the foster mother doesn't approve of this. When punished by being spanked or placed on a chair, he takes it without any display outwardly. He never really has a temper tantrum. He gets peeved when he is frustrated. He has always been a good eater. There is no difficulty getting him to bed at night or getting him up in the morning to go to school. He sleeps in a bed by himself in the room with his brother. In addition to the twins there is an older brother and a younger brother and one older sister. The children are all in foster homes and have visited C-2-5 on different occasions.

This was all the information that the foster mother was able to give.

Physical Examination: Blood Pressure 100/60. C-2-5 came to the examining room willingly. He said he likes school and likes to play there. He is a very polite little boy, answering "Yes, Sir" and "No, Sir". He was able to recognize a penny, nickel, and dime, but was unable to give their values. There were no dreams, he said. He was able to count up to ten and was able to recite the alphabet fairly well. The child was not very verbal.

He was left-handed, was unable to hop on his left foot but could do so on his right. He was unable to skip. C-2-5 knew the parts of his body and his speech was noted to be grossly normal. The child undressed and dressed himself fairly well and could tie his shoe laces. There was no other evidence of any visual-motor incoordination.

He had a high arched palate. Teeth were carious but numbered ten on top and ten on bottom. Harrison grooves were present but minimally so.

Neurological examination was grossly negative.

Neurological Examination: Cranial Nerves - First cranial nerve was not tested. Second cranial nerve - fundi are normal. Visual fields are grossly normal. Third, fourth and sixth cranial nerves - the extraocular movements are intact. No nystagmus is present. There is no sign of strabismus. Pupils reacted to light and accommodation. Fifth cranial nerve - corneal reflexes are normal. This nerve is normal as far as motor and sensory is concerned. Seventh cranial nerve - normal for motor function. Taste was not tested. Eighth cranial nerve - air conduction is greater than bone conduction. The boy was able to hear the spoken voice and the tuning fork without difficulty. Nint and tenth cranial nerves - the uvula went up in the mid-line and the boy was able to swallow without difficulty. Eleventh cranial nerve. The boy is able to shrug his shoulders without difficulty. The sternocleidomastoid muscle is normal. Twelfth cranial nerve - the tongue protrudes in the midline and there is no sign of atrophy or fasciculation. Sensory - Pin prick, touch, vibratory position and stereognosis are all normal. Pin prick localization, double simultaneous stimulation, using both arms, the left arm and left face, right arm and right face and both legs, is normal. Pin prick localization is also normal. Reflexes - Reflexes are equal and active throughout. No pathological reflexes are present. There is good motor strength throughout. Cerebellar - Finger-to-nose and heel-to-shin tests were well performed. Diadochokinesis is very poorly performed. The boy is not able to spin the jack but he was able to do patting movements without difficulty. Station and gait - the boy was able to walk without difficulty on his heels and toes. Romberg is negative. Comment: This boy is left-eyed as well as being left-handed. He has a definite speech defect in which he stumbles over words as he says them. He apparently cannot read. He was able to do a very poor diamond.

Electroencephalogram: Attitude and condition of patient: alert, cooperative. Fundamental frequency: ranged between 8 and 9½ waves per second, isolated and short sequences of 150 to 200 millisecond waves are scattered throughout the record. Fast waves: were not prominent. Amplitude characteristics: average voltage; transient irregular modulation. Additional feature: no paroxysmal activity was observed. Hyperventilation: generated approximately 4 per second activity, primarily in the homologus frontal and temporal derivations. Impression: within the range of normal variation.

Speech and Hearing Evaluation: Speech and Language Development - The details of this child's development are not known. His stuttering is almost completely under control; he only stutters when he gets excited. The parent feels that stuttering in the child is no longer a problem.

General Behavioral Observations: C-2-5 came willingly into the examining room. He stuttered a bit in the waiting room and during the initial part of the testing situation, and then there was no stutter block or hesitation in his speech. He talked freely, if not volubly, during the entire examining session.

Oral Examination: The oral musculature is normal. The velum is of adequate length and there is good bilateral lift. He has good control of his tongue and lips. Teeth are in fair occlusion as there is a slight overbite.

Articulation: Articulation is good. He substitutes an f for a th in most words. He can correct this readily if asked to do so, but it is not maintained.

Voice: Voice is of good quality. While he tends to talk slowly and carefully, the rate is within normal limits and is not conspicuous.

Propositional Speech: The child seemed to have taken undue care with his articulation during this interview. As a consequence, it was slow in rate. He enjoyed talking and expressed his ideas well. His story of the Three Bears was well organized and told with a great many details and with many dramatic flourishes. A number of errors were observed with verbs in the telling of this story - "she seen, she taste of it", and the like. It was also noted that he told the story directly to the listener and many times looked in the Examiner's eyes. In the past, there was a great deal of avoidance of eye contact. A fair number of complex sentences were used. When presented with the three pictures about which to tell a story, he had the beginning of a story formed albeit it was without elaboration. The one about fishing consisted of two sentences: "These men went fishing. This man caught a fish." The story about the A & P was much more disconnected. In the third picture, consisting of a family bidding good night, he said that it was Christmas morning and the children were very happy and came running down with their pajamas on.

Hearing: This child gave very quick, accurate responses to the test by Pure Tone Audiometry. There was good localization from ear to ear. The following audiogram was obtained:

Right:	15	0	5	0	0	10
	250	500	1000	2000	4000	8000
Left:	20	10	5	2	5	5

He readily repeated the spondee words as well as the PBK list with no errors. Hearing is well within normal range.

Psychiatric Evaluation: C-2-5 was a towheaded, friendly but quiet seven year old who looked at least a year younger. He was neatly dressed in long dark blue trousers and a very white shirt with matching bow-tie and cuff links out of cloth. While he was slow to open up in conversation, he was immediately fascinated with Bobo and, after saying "clown" and being shown what he could do with Bobo, he spent the next ten minutes hitting him down, picking him up, and smiling his beautific smile. He was somewhat awkward in his pokes and despite the history of left-handedness, as well as a statement by C-2-5 to the same effect, he did all his hitting with the right hand until specifically asked to try it once with his left. His righthand motions were awkward but less so than the left-hand. In much the same fashion, he turned to the punching bag, accepting the suggestion to move baseboard farther out into the room so that he could take a wider swing. However, he had been ready to oblige with a swing, even inclose quarters. This lad constantly seeks approval.

He turned from Bobo to some toys, picking the sections of fence. He had a good concept of what was right-side-up and how to join the sections. Several fit poorly into one another and C-2-5 would no sooner get two sections joined when two others would separate. He laughed about this and would have kept it up until the sun set, trying to have everything stay together at one time, if the Examiner had not suggested we do this together. He next turned to the favorite wind-up train and was much surprised and puzzled that it went around in a circle all by itself. He decided it would be nice to build a fence around it, saying "there, let it rest awhile". When he had the fence all built, again with help at points but not where it concerned the concept of the joint in this particjlar fence, he ran the train around within the fence.

In the finger painting, he wanted to help pin up the paper, although initially he hung back. He had a fine time applying one color after the other and his movements became far less awkward as he relaxed. He decided first to draw the inside of the house. This led him to smear one-quarter of the page with green. This was followed by the living room, which was made black, and then he forgot about this idea altogether, it would seem, and continued with colors as part of a design. He was not overly neat nor overly messy in his paint play, when through, he washed his hands and looked around for towels, climbing up to get one for himself and then seeing the Examiner, going back and getting another one for her. Lastly, he drew a house and a person on request. As he drew the house, he said "it's a small house, isn't it?. . . It's nicer that way." Then he put a window in for each room, starting again with the bathroom, followed by the living room, then kitchen, then bedroom. He drew the door and pointed it out to the Examiner, naming handle and then adding windows in the door. His draw-a-person was somewhat grotesque looking. On the other hand, there were no stick arms and legs. All the essential elements were there, but distorted in size and position. Particularly distorted s the relationship of the trunk to the legs. The blue crayoning represented rousers and the "legs" were indicated by the white areas, off which were aced the toes. He was quite proud of this drawing. When he was asked for s name, he spelled it out first, looking very pleased but having omitted e letter. With some encouragement, he wrote his name.

We are continuing to see a child whose intellectual capacity may be till greater, as must be determined by the extend to which he widens his so- al and cultural experiences in the growing-up process. While there was no uttering today, language was immature. The examiner was most impressed with e improvement which has occurred in the past two years, in a very warm, ccepting foster home. It is felt that C-2-5 will be able to develop to his ghest potential within this particular family setting, and that what is seen f shyness and passivity will continue to be ameliorated as he gains further ocial acceptance and academic recognition.

Psychiatric Re-evaluation: C-2-5 was his usual smiling self. There s no spontaneity to his conversation. Also, there was no stuttering.

He spent a great deal of time hitting Bobo's replacement about. He ok the BB gun and shot the boxer with great glee "in the bottom". His ay with the train consisted of stopping it with the butt of the gun and let- ng it continue again. His only wish was for a pony. His drawing of a per- n was very immature; tiny, stick-like extremeties, square body, huge round ad, eyes placed in a very lateral position with nose, mouth and moustache dead center.

Conversation with foster mother: She sees child "as much better in ery respect." He listens better, seems to understand what is spoken, and not as fidgety as he was. She notices that the child hardly stutters now. is also more willing to go out and play with other youngsters and partici- tes in neighborhood games, whereas before he had tended to hang back on the inge of the group.

Comment: The domestic atmosphere and a great deal of understanding by e foster parents have contributed much to the progress C-2-5 has made.

anford-Binet, Form L (Pre-test) (5-15-57)

A.: 7--8
A.: 6--4
Q.: 82

This child's learning ability is at a Slow Learning level. The mental e is 6--4, and I.Q. 82. The Basal Age is at Year VI, while the Ceiling is Year VIII. The present test is consistent with testing done 11-15-55 when Stanford-Binet, Form L was administered, with resulting I.Q. of 77.

The range of only three years suggests an overall dullness, with ither extreme relative weaknesses nor strengths.

At Year VII S was unable to see the absurdity of situations presented pictorially. Seeing absurdities in pictures involves some of the same elements that are involved in pointing out the incongruities of situations presented verbally, although there is a concrete stimulus to which the child can react when pictures are used. When shown a picture of a man and woman sitting in rocking chairs in front of their house, with the rain pouring down on them, and asked what is foolish about the picture, S said, pointing to some shrubber in the distance: "Because a tree is growing in the house." This same lack of ability to differentiate and discriminate the important aspects of a situation may be seen in his response to the picture showing a man carrying an umbrella in such a position that it offers no protection: "The man is wearing an umbrella." When questioned about this he said: "He's not supposed to." Further questioning resulted in: "Because he's wearing a hat." Another weakness is in comprehension of problem situations. When asked what he should do if on his way to school he saw that he was going to be late, he said: "Run back home." When asked what to do if another boy hit him without meaning to do so, he said: "Hit back." He was unable to copy a diamond or repeat five digits. It should be noted that he repeated the correct digits, but repeated them in improper sequence.

At Year VII two items were passed. S passed the similarities item, although his responses were so immature and the concepts so poorly developed that they were minimal passes. For example, when asked how an apple and peach are alike, he said: "Got seeds in them," seizing upon an inconsequential similarity. When asked how a ship and automobile are alike he said: "Cause they run."

At Year VIII all items were failed. S was unable to keep the details of a story in mind. When asked what he sould do it he were in a strange town and someone asked him how to find a certain address, he said: "Tell them to go up a block and turn." He was unable to repeat a sentence, again showing weakness in immediate memory. When presented with similarities and difference at this level, he was able to give similarities or differences, but without prompting was unable to maintain the directing notion of giving both.

Vocabulary was passed at Year VI. There was a tendency to respond to the words in terms of their sounds rather than meanings. When asked to define lecture he said lectric and for haste he said hate. When asked to define eyelashhe at first said that he did not know, but after the vocabulary words were completed he was asked if he had an eyelash, and pointed to his eyebrow.

Stanford-Binet, Form M (Post-test) (6-22-58)

C.A.: 8--9
M.A.: 8--0
I.Q.: 91

The present I.Q. of 91 is nine points higher than the pre-test. The four year range of performance is from a Basal Age at Year VII to a Ceiling at Year X. It is important to note that over the three year period from 1955 to the present the I.Q. has steadily increased, from a low of 77 in 1955 to its present level.

At Year VIII S was unable to pass the similarities item, the only item failed at this level. When asked how a mosquito and sparrow are alike, he said, "They look alike." For bread and meat, he said: "They are square, that's how they are alike." This was evidently a perseveration from the question asked immediately preceding, in regard to the similarity between window and door.

Only one item was passed at Year IX, repeating four digits reversed. When asked for words that rhyme, S resorted to alliteration instead, saying: "Dale, day, did." Similarities and differences was a minimal failure, with three being correct when four are needed at this age level. S could not see the absurdities in described situations, reassemble a dissected sentence or draw designs from memory.

All items were failed at Year X.

Ammons Full Range Picture Vocabulary Test (11-27-57)

C.A.: 8--3
M.A.: 7--6

The mental age on this test is somewhat higher than that obtained on the pre-test Stanford_Binet. The following words, expected successes at this age level, were failed: vegetable, customer, fuel, skyscraper, razor, cheerful, broadcast, and protection.

Goodenough Intelligence Test

Pre-test (5-15-57)	Post-test (5-15-58)
C.A.: 7--8	C.A.: 8--9
M.A.: 4--9	M.A.: 7--9

There is a very marked improvement on the post-test drawing. In the pre-test drawing the figure was extremely primitive, consisting of a circular head with eyes but no nose or mouth, with legs attached directly to the head, and no trunk. Arms were attached directly to the legs. The post-test drawing was much more detailed, with hat, nose and mouth, arms that bend with fingers attached, belt, pockets and a gun. S called his drawing "A cowboy", and it was quite recognizable as such. The mental age on the post-test was much more nearly in line with the Stanford-Binet test results.

Block Design and Coding From WISC (5-15-57)

	Raw Score	Scaled Score	Test Age Equivalent
Block Design	5	5	6--6
Coding	15	4	5--2

Designs A and B of the Block Design were drawn correctly on the first attempt, and Design C was correct on the second. S could not progress beyond that point, being unable to grasp the principle of using diagonal blocks. On the Coding fifteen substitutions were attempted, with no errors. S was extremely slow and careful on this test, which reduced his score considerably. The Block Design equivalent test age is quite close to the Stanford-Binet mental age, but the Coding is quite a bit lower.

Bender-Gestalt Test

Pre-test (5-15-57) there were seventeen errors, including two immature, three perseverations, one dissociation, one closure, two incorrect elements, three distorted angles, three enlargements, and two disproportions. On the post-test (5-15-58) marked improvement is seen in that only four errors were made, including one incorrect element, two distorted angles, and one compression.

Syracuse Visual Figure Background Test

Pre-test (11-18-57) there were six correct figure responses, five background, and one perseveration. Post-test (5-15-58) there were seven correct responses to the figure, three background responses, and no perseveration noted Thus, improvement is seen in accuracy of perception, decrease distractibility by background stimulis, and lessened perseverative tendencies.

Tactual Motor Test (11-18-57)

S drew the triangle, both with plain and with thumbtack backgrounds, but the other drawings were completely unrecognizable. He called Bender Figure 4 a "circle," and promptly drew one.

Marble Board Test (11-18-57)

Marble Board 1 was correctly reproduced, the method of approach being continuous, and organization articulate. His drawing of the design shows good comprehension of the basic configuration. Marble Board 2 was incorrect with three misplaced marbles, the method of approach segmental, and organization was global. While the drawing is rather distorted, it nevertheless is recognizable.

Vineland Social Maturity Scale

Pre-test (12-13-57)		Post-test (5-23-58)	
Total Score:	63.5	Total Score:	75
Age Equivalent:	6--6	Age Equivalent:	9--3
Social Quotient:	79	Social Quotient:	105

The foster mother served as informant at both interviews. The social quotient was twenty-six points higher in the post-test period, showing a greatly increased rate of social development. S has developed a number of skills, absent at the beginning of the academic year, such as participating in pre-adolescent play. This includes such games as tag, ball, and cowboys and Indians. He does small remunerative work, mostly chores around the house for which he is paid spending money. He also does simple creative work, such as building objects like sleds, airplanes, etc. The foster mother feels that much progress has been made, and that this is not something she alone can see, for various neighbors have commented on it.

Summary:

S shows improvement on all five of the psychological tests on which there is pre- and post-tests for comparison. Intelligence is now within the average range, although at the beginning of the year it was in the Slow Learning range. The I.Q. has shown a steady increase over the past three years, from a low of 77 in 1955 to the present high of 91. The main intellectual weakness was in abstract ability, as involved in seeing similarities or solving problem situations. The post-test Goodenough Intelligence Test mental age was almost identical with that on the Stanford-Binet, while the pre-test indicated much lower ability. Marked improvement occurred on the Bender-Gestalt Test, where seventeen errors were obtained on the pre-test, and only four on the post-test. There were fewer immature drawings, i.e., drawings at least two years below the mental age, and considerably less perseveration. On the Syracuse Visual Figure Background Test there was increased accuracy, less distractibility by background stimuli, and less perseveration. A marked increase in the rate of social development was seen on the Vineland Social Maturity Scale, where a twenty-six point higher social quotient was obtained on the post-test.

Neighbors and other interested adults made frequent comments concerning S's growth and development this past year. He is a much more comfortable child in the classroom, and has earned himself a place with the other children.

PEDIATRIC HISTORY: C-2-6

The pediatric history was obtained from both parents. They seemed quite young, relaxed and easy-going. Both of them participated in supplying the information. The mother was seen to be constantly picking on her fingers, playing with a rubber band or with her wallet. She also spoke quite loudly.

One of the most outstanding difficulties which C-2-6 is said to be experiencing is the difficulty with her speech. She is said to be unable to talk properly. She mades herself understood to some degree; however, adults do not try to understand her and seem to lose patience because of this language difficulty.

She is in a special education class. She is slow in picking up certain things at school (it was the father who mentioned this bit of information). For example in things like numbers and arithmetic, she is apparently able to recognize words much better than numbers. Parents have tried working with her around this difficulty she seems to be having with numbers. Although she is able to recognize a number and point to similar figures, she has difficulty in remembering or recognizing the word for the number.

She is said to have a good memory for places. For example it was stated that she recognized a road that they had traveled on only once ten months previously. She was able to pick out one store from many on a street in a shopping area because the mother had taken her there once. Apparently she has always had this ability for fine details.

C-2-6 is said to have a terrific fear of fire engines. As a possible explanation it was noted that at about the age of two the family lived behind a fire-house and frequently she would be awakened at night by the noise of the siren. At these times it appeared that she was quite terrified. There was also an experience when mother was pregnant with the baby sister when C-2-6 was about five-and-a-half years old that the bag of water broke and apparently C-2-6 has always remembered this because there was a great deal of excitement associated with it. Once when noticing men who were on a construction job nearby filling up their buckets with water, she said something about that they were silly to do this as the water would break.

It was further stated that C-2-6 was always an easily frightened child. She, for example, likes to watch TV as long as there is not too much action or peculiar characters (things like Howdy Doody or other puppets). She is also afraid of rain and thunder. Presently she will only go out in the rain if she is properly protected so her head especially does not get wet. It was further stated that as an infant she was rather inactive and slept a good deal of the time and was a very quiet baby.

Family Background:

1. Maternal grandmother is living and well.
2. Maternal grandfather living and well.
3. Paternal grandmother living and well.
4. Paternal grandfather is dead; died of a coronary thrombosis at the age of fifty-six.
5. Mother has three brothers and three sisters all of whom are living and well.
6. Father has three sisters all of whom are living and well. There was one brother and one sister who died as infancts, one following a fall during which she struck her head and the brother having died from some congenital malformation of the gut.

There is a maternal grandmother who had diabetes. The remainder of th family history is not remarkable. No history of co-sanguinity.

Family History:

Father: Thirty-two years of age and in good health. He is an aircraft mechanic in the Navy and has been in the Navy for the past fourteen year He finished high school and had various specialized courses in mechanical trai ing.

Interests: Outdoor sports, gardening; likes to make things and repair things around the house.

Problems: None in particular.

Personality: Mother said "lovable". She said he has little temper.

His attitude toward the child's problem: He said he felt that he was realistic enough and would see what could be done for her and try to do the best they could.

Mother: Twenty-five years of age and in good health. Used to be employed as a seamstress in a factory for about oneyear. She finished three years of high school.

Interests: Sewing, bowling, "hen-parties."

Problems: None.

Personality: Quick tempered but really other than that everything is OK.

Attitude: She felt badly; however, the main thing is to do as much for her as can possibly be done. She would like for her never to feel that she was unwanted. She feels that C-2-6 should be permitted to make use of what she has. She does not want anyone to push the child around or take advantege of her and this is especially true as she is said to be easy goind and very susceptible to suggestion of others.

Pregnancy:

The mother had two miscarriages at approximately six weeks of gestation; one was between C-2-6 and her brother and the other was right after the brother. There was apparently no reason given for these miscarriages. She was eighteen years of age when C-2-6 was born and was under constant attention of doctors. Of note is the fact that at approximately three months she began spotting and was put to bed for approximately two weeks. She never went backto work after that. At the time there was a serious question as to whether she would be able to continue to carry the baby to term. At five months gestation the physician who took over was the one who delivered C-2-6 after ten months gestation - she was definitely a late baby. The delivery took place at a hospital. At nine months gestation the mother fell and broke her ankle but made an uneventful recovery. Six days after the date of confinement, her pelvis was X-rayed and she was told that the baby's head was in an abnormal position and this was why she was late in being born. Finally 19 days after the X-rays, she was taken to the hospital and a caesarian section was performed because of signs of impending toximia. Immediately following the birth both the mother and the baby were said to be jaundiced and each stayed in the hospital for two weeks,then left. Birthweight was eight pounds and five ounces and except for the jaundice the neo-natal period was said to be unremarkable.

Marriage: The parents have been married for eight years and this is said to be a compatible marriage. First marriage for both. They are of the same religion; both share the responsibility equally in the home and in raising the children. The father is not away for any length of time except perhaps for a two-week period during the summer when he is out on a training cruise.

Siblings: (1) A brother, five years of age. He too has a speech problem - articulation; otherwise he is fine. He gets along well with C-2-6. (2) A sister who is eighteen months of age, who is not yet talking but is beginning to say words. She had a congenital dislocation of the left hip which was castered at about six weeks of age and is perfectly well now.

Past History:

C-2-6 did not have her DPT and smallpox vaccination until she was three years of age because she had so many colds, upper respiratory infections, etc. She has had many injections of penicillin during the first year in order to "break the colds." Since then she has had her Salk vaccine.

Measles at the age of five. She has never had any conculsive seizures and presently is on no medication. She apparently is said not to react violently when given injections of penicillin or when undergoing any type of pain. An example of this was that when she was scalded with hot water, she did not even cry, mentioning it to her parents: "Look, I didn't even cry."

Developmental History:

C-2-6 was bottle fed, sucked well, had no difficulty swallowing. Solid food was started at approximately two months of age. She was weaned from the bottle at approximately twelve months of age without any difficulty whatsoever. There is no history of pica. Her sleeping habits were always very good and she still naps in the afternoon. She sucks her thumb and the satin edge of her blanket when in her bed. There is no rocking or head-banging. Toilet trai ing was accomplished by fifteen or eighteen months of age without any difficulty. Now there is only an occasional episode of enuresis. She is right-handed and apparently always seemed to be. Mother and brother are left-handed. It was stated that for awhile C-2-6 did not seem to know whether she would be right or left-handed but then apparently made the choice of being right-handed by herself. She did not roll over until the age of eight months. She sat up at about eight months, never crawled; she stood alone at twelve or thirteen months of age. She did not begin walking until about fifteen months of age. Her teething was normal, her speech was definitely and markedly delayed and abnormal in its quality. Her bottles were propped and she was never able to hold them by herself. When she was weaned, she did hold the cup alone. She was always able to follow instructions, always had short attention span and there was no evidence of any visual, auditory difficulties. She is said not to be particularly hyperactive; on the contrary she, if anything, is rather on the lethargic side.

Present Situation:

C-2-6 is said to be able to dress herself completely including tying bows on her dresses, laces her shoes; she can button buttons, zip zippers and even work safety pins. She eats with a fork and spoon because she is not permitted to use a knife. Her attention span is rather short. She will sit now and allow herself to be read to. She watches TV and has been in drive-in movies. She goes to Church, Sunday School. Games: she likes to play with dolls, puzzles. She prefers to play with younger children and especially babie and to sort of take care of them. She is able to roller skate and ride a tricycle. She is said to be able to count up to twelve.

Personality:

When punishment is meted out, which is very seldom as it is not really necessary too often, she is so sensitive that she will respond to a simple scolding. She cries and says she is sorry.

Fighting: Makes no attempt to fight or protect herself.

Frustration: She will either sulk or cry.

Physical Examination: Blood pressure 90/60.

General appearance: C-2-6 is a very pretty, well built, stocky, seven year old girl with blond hair and blue eyes. When walking she started with her head down and walked somewhat clumsily about slapping the soles of her shoes on the floor. It was felt, however, that this was an intentional type of gait rather than one over which she had no control. Upon giving her name and her age a speech impediment was quite noticeable. Her fingers are very short, stubby and approximately the same length. She had epicanthic folds in both eyes as in mongoloid children. There are, however, no other features of mongolism. Subject has a pale flame nevus on her forehead above the bridge of her nose. It was almost impossible to do any type of subjective or projective tests on a verbal level due to the speech and language formulation problems. When asked to undress, became quite frightened and refused to remove anything other than her shoes and socks. After taking off her socks it was noticed that her toes were short and stubby, the fourth and fifth toes being of equal length. She was able to count up to twelve. She was unable to recognize coins and did not know their value.

She was unable to hop on her right foot nor to skip. The remainder of the examination was not remarkable. In getting dressed, it was noted that she put her left sock on first and tried to put her right shoe on her left foot, then realizing the error she changed it. She was able to tie her shoe laces quite well.

Neurological Examination: The first cranial nerve was not tested. Second cranial nerve - determination of the visual field on this little girl was not possible. She appeared to see everything within the usual range of vision. Fundi were normal on a very bried examination. Third, fourth and sixth cranial nerves - pupils reacted to light and also to accommodation. Extraocular movements were intact. No nystagmus was present. Fifth cranial nerve - normal for motor and touch. Seventh cranial nerve - taste was not tested. Muscles of facial expression were normal. Eightth cranial nerve-hearing seemed to be normal for tuning fork. She heard what was said to her. Ninth and tenth cranial nerves - could not be adequately tested. Eleventh cranial nerve - was intact. Twelfth cranial nerve - the tongue protruded in the midline and showed no furrowing or atrophy. Sensory examination - the child is able to feel touch and pin prick and vibration. Position sense, two point discrimination and pin prick localization could not be carried out.

Stereognosis was normal. Reflexes - reflexes were equal and active throughout No pathological reflexes were present. Motor - motor appeared to be normal. Cerebellar - finger-to-nose and heel-to-shin tests were all performed. She was unable to spin the jack with either hand, not so much from lack of coordination but from inability to understand directions for completing task. Station and Gait - Station and gait were normal. Romberg was negative. She was able to walk on heels and on toes without any difficulty. Movements - no extrapyramidal movements were seen. Mental Status - this child seems to be rather immature in writing, the letters lacking proportion and her copy ran off the end of the page. She leaves out letters, and was unable to draw a diamond. Her drawing of a house was primitive. The child is right eyed, right handed and right footed. There is no apparent dominance problem.

Electroencephalogram: Attitude and condition of patient: alert, cooperative. Fundamental frequency: ranges between 6 and 7 waves per second. Slow wave: isolated 200 to 250 millisecond waves are seen in each occipital derivation. Fast waves: are not prominent. Amplitude characteristics: average to high voltage (90 microvolts peak); irregular modulations. Additional features; no paroxysmal activity is observed. Hyperventilation: accentuates the prominence of the bioccipital slow wave output. Impression - minimal generalized abnormal EEG.

Speech and Hearing Evaluation: The parents report that C-2-6 was a very quiet baby and "slept all the time". At first they congratulated themselves on having such a "good" child. As an infant she demonstrated very little vocal play and limited babble. Parents commented that they began to be concerned when she was quiet in Church and did not make sounds like other children. At age three and a half it was estimated that she had no more than six words and even these were not very clear. At this point they requested advice on what to do about the delayed speech. She did not start to group words into two word phrases until about five years of age. She used no more than two word groupings for the next six months.

After this period there was a tremendous spurt in vocabulary and language. Hearing or language comprehension has never been questioned by the parents. She couldn't or wouldn't imitate words until after 4 years of age.

In July 1956 she was seen at a Diagnostic Speech Clinic. At that time her speech was diagnosed as a severe dyslalia in an immature, distractible child with a very short attention span. Arrangements were made for speech the: apy. As a result C-2-6 became more speech conscious and was able to make some corrections with guidance.

It is the parents impression that their daughter is now using a great many new words. They feel she is trying hard to talk correctly and when she is not understood, will make repeated attempts to correct herself.

Behavioral Observations: Her overall reactions to the test situation were those of a much younger child. Her general behavior could not be described as hyperactive. Her speech and language reflect overall immaturity. She related well when her attention could be held and on some occasions giggled easily. Under pressure, she played with her shoes and generally fingered things on the desk.

Oral Examination: The oral examination is unimpressive. Teeth are in good occlusion and the velum is of good length. She has a good nasal-pharyngeal closure and good control of her tongue and lips.

Articulation: Articulation shows marked infantile perseveration, including omissions, elisions, distortions, substitutions and defective sounds. C-2-6 can imitate all sounds readily in isolation. There is little or no carry over in propositional speech. "s", "sh", "ch", and "j" are usually pronounced as "d". Most final "th" sounds are omitted. She substitutes "w" for "l" and "r" though these substititions are inconsistently used in an initial position. Most blends are defective.

Voice: Voice is of good quality with no nasality or breathy emission. There are great changes in pitch, rate and inflection.

Propositional Speech: General conversation shows immature grammatical structure. C-2-6 now uses a fair number of simple sentences but frequently omits words and there is evidence of a great deal of disorganization and clutter. There was a great deal of dramatic inflection and change of voice as she took the voice of the various characters in the story of the Three Bears. Typical of her manner of conversing was this kind of sentence: "Baby Bear too hot."

When presented with picture and asked to tell a story she did much better than anticipated. For example, she talked in some six or seven incomplete sentences about a picture of the two children getting ready for bed before launching into random discussion and forgetting her idea about this particular picture. It is felt that her poor attention span and short memory contribute to her inability to express herself clearly as well as her inability to imitate pollsyllabic words which are unfamiliar to her.

Hearing: C-2-6's short attention span made the hearing test a real struggle. However, she repeated enough of the spondee words to indicate that there is no hearing difficulty per se. Her articulation was so poor that the PBK words were of little value. Test by Puretone audiometry was done with the following results:

Right:	10	5	5	15	10	20
	250	500	1000	2000	4000	8000
Left:	15	10	5	10	15	15

C-2-6 had to be tested skillfully and quickly due to her short attention span. As a result she may have had some difficulty in localizing in which ear the test tone was heard. Localization appeared better when the tones were loud. My impression is that hearing is within normal range.

Impression: An immature, distractible child with a very short attention and memory span whose delayed language, speech development and infantile perseveration reflects her immaturity. There is some self-monitoring of speech output but C-2-6 still has a long way to go.

Psychiatric Evaluation: C-2-6 gave her stated age correctly as six and during the interview, was at all times a friendly, cheerful, cooperative young lady. Despite simple sentences and a small vocabulary, she made herself understood to the Examiner with the help of only occasional repetitions.

C-2-6 came willingly to the office opening the stairway doors herself. Once inside the playroom, she was attracted briefly to Bobo, the clown, then, in rapid sequency, to the clay, finger painting and doll house. She settled for the doll house (which was in total disarray) and fixed an orderly house with the furniture appropriately placed with only one exception. The sideboard piece was placed directly across the entrance to the house. She saw nothing incongruous about this arrangement and readily accepted the suggestion that it might be a good idea to look for another place to put it, which she did.

Subject appeared interested in finger painting and between us we pinne paper on the easel and opened the jars. She began her painting with yellow, followed by red. She insisted upon sitting down on the floor and stretching up to the easel in order to paint. She informed the Examiner that purple was made by mixing red and yellow but she listened carefully when she was corrected, and after several attempts to say "red and blue make purple" was able to repeat the words correctly. After completing two pictures, she said "That's enough - now I want to do something with Bobo and then use Play Do". "Put tops on please".

C-2-6 was curious about the punching bag, and hit it with fairly good coordination. This activity did not interest her more than a few minutes, after which she moved on to Mr. Bobo saying, "What's new with you'.

Subject appeared to wish to "do for herself", and struggled to complete an activity. For example, she was very loathe to give up in her efforts to pry the lid off the Play Do, however, there was no overt sign of impatience or anxiety evidence during her struggle.

While she understood the story of the father, mother and baby bird in the Despert Fables she apparently failed to grasp the problem facing the baby bird.

Comments: The Examiner was impressed with C-2-6's energy and her motivation to please.

Psychiatric Re-Evaluation: While the Examiner's overall impression remained approximately the same, C-2-6 has made definite progress in certain areas. For example, while she still wanted to keep the drawings she made, she did not protest to the same degree as in the previous interview. Also, her replies to some questions were more detailed.

C-2-6 played with the Play Do much as she had before, mixing the colors by squeezing and patting them together in the fashion of a much younger child. She was clumsy with toys. There was obvious difficulty in grasping the mechanics of the Schmoo family (a series of white penguin forms in graduates sizes one within the other.)

Her continued perceptual problems were clearly illustrated in her draw-
g which showed little understanding of forms. On occasions she became stu-
orn and sulky when questions necessitated answers she was unprepared to give,
t the moods passed quickly.

Parent Evaluation: C-2-6's mother does not feel the improvement in
r daughter's problem is as noticeable this year as it was the previous year.
ther that there has been continued improvement at a very steady pace. Speci-
cally, she feels her daughter has learned more about home duties (picking
her cloths for example) and helping with her appearance - such as keeping
r hair neat and attractive.

She plays better with her peers, her mother feels, perhaps because she
s improved in speech and they can understand what she wants. However, she
es not get hurt so easily by what other children do or say to her and does
t come running home crying except at infrequent intervals.

anford-Binet, Form L (Pre-test) (6-7-57)

A.: 6--11
A.: 5--5
Q.: 78

Learning ability is within the Slow Learning range. The mental age
5--5, and I.Q. 78. The Basal Age is at Year IV, while the Ceiling is at
ar VII. Previous intelligence testing, 4-19-56, with the Stanford-Binet,
rm M, resulted in an I.Q. of 68.

At Year IV-6 all items were passed except opposite analogies and repeat-
g four digits. S did not seem to grasp the concept involved in the opposite
alogies test. Immediate memory span was very poor, and even three digits
re too difficult for her.

At Year V the only item failed was, again, concerned with immediate
mory span, but this time it involved meaningful material in the form of sen-
nces. When asked to repeat the sentence: "Tom has lots of fun playing ball
th his siter." S said: "Tom likes playing with his sister." In the direc-
ons before administering this item the child is asked to say "big girl", and
en "I am a big girl." S could only say: "I big girl."

At Year VI two items were failed, number concepts, and copying a bead
ain from memory. S seemed to have a good concept through fourness, but could
t handle number concepts above four. In copying a bead chain from memory she
emed to get the concept of alternating forms, but her bead chain was quite
related to the stimulus.

All items were failed at Year VII. Items involving abstract ability,
ch as in seeing the similarity between two things, was quite beyond her.
mprehension of concrete, practical situations was also poor. For example,
en asked what she should do if she should accidentally break something which
longed to someone else, she said: "Call the police." When asked what she
ould do it she were on her way to school and saw that she was in danger of

being late, she said: "Go back home." Her diamonds were very poor, having but slight resemblance to the stimulus figure.

Stanford-Binet, Form M (Post-test) (5-22-58)

C.A.: 7--10
M.A.: 6--0
I.Q.: 77

There is only one point difference between the I.Q. obtained on pre- and post-test Stanford-Binets. The intelligence is within the range of the Slow Learning group, and the four year performance range extends from a Basal Age at Year V to a Ceiling at Year VIII.

At Year VI the only item failed was differences. In this item the child is asked the difference between quite common objects. For instance, when asked how a slipper and boot are different, S replied: "A little girl has a boot and the little boy as a slipper."

The only item passed at Year VII was giving the number of fingers. S gave the correct number on one hand, on the other, and then the total number. In repeating sentences from memory she left out the most important qualifying words, and in repeating three digits reversed, said any number that occurred to her. Picture absurdities, sentence building, and counting taps were too difficult for her.

All items were failed at the Year VIII.

Ammons Full Range Picture Vocabulary Test (11-27-57)

C.A.: 7--5
M.A.: 6--0

The mental age obtained on this test is only slightly higher than that obtained on the pre-test Stanford-Binet. The following words, expected successes at or below this child's chronological age level, were failed: vegetable human, customer, island, manufacturing, cheerful, collision, listening, uniform safe, and protection.

Goodenough Intelligence Test

Pre-test (6-7-57)	Post-test (5-12-58)
C.A.: 6--11	C.A.: 7--10
M.A.: 6--0	M.A.: 5--3

The post-test drawing is somewhat more crudely drawn than the pre-test. The first drawing shows a trunk, hair, but no mouth or arms. Post-test: there is no trunk, the arms and legs being attached directly to the head.

Block Design and Coding from WISC (6-7-57)

	Raw Score	Scaled Score	Equivalent Test Age
Block Design	2	6	4--10
Coding	13	5	4--10

S was able to do the first Block Design on the first attempt, but could do no other designs. She got colors confused, and showed no grasp of the basic form necessary for this task. The equivalent test age of 4--10 represents the lowest score possible on this subtest. The same score was earned on the Coding, Form B, where only thirteen substitutions were attempted.

Bender-Gestalt Test

Pre-test (6-7-57) there were twenty-two errors, including three immature, three perseverations, four dissociations, one closure, three incorrect elements, one unrecognizable, three distorted angles, two rotations, one enlargement, and one disproportion. Post-test (5-12-58) there were eighteen errors, including one immature, one perseveration, two dissociations, one closure, three incorrect elements, three distorted angles, one rotation, four compressions, and two disproportions. Thus, slight improvement is seen in the fewer number of drawings categorized as immature, fewer dissociations, and less tendency to perseverate.

Syracuse Visual Figure Background Test

Pre-test (10-24-57) there were four correct responses to figure, no background responses, and four perseverations. Post-test (5-12-58) there were six correct responses to figure, two background responses, and five perseverations. Thus, there was a slight increase in accuracy, but this was offset by more distractibility by background responses and more perseveration.

Tactual Motor Test (10-24-57)

S seemed to be completely unable to appreciate a figure felt through a screen. Even when the Examiner drew her fingers over the raised figure, she seemed unable to grasp the fact that there was "something there" that could be drawn.

Marble Board Test (10-24-57)

On Marble Board 1 S started at the upper left hand corner, and proceeded to fill in every available space with marbles. When she attempted to draw the design made by the Examiner, she made many horizontal x lines across the paper. In reproducing Marble Board 2 she made one long diagonal line from corner to corner, and then started to fill in all available spaces. Her drawing consisted of a very large "X".

Vineland Social Maturity Scale

Pre-test (11-20-57)	Post-test (5-13-58)
Total Score: 67	Total Score: 71
Age Equivalent: 7-4	Age Equivalent: 8-4
Social Quotient: 100	Social Quotient: 106

The mother, who served as informant at both interviews, expressed satisfaction with S's progress. She feels that the improvement in speech has helped with her relationship to other children. There is but a slight difference between social quotients, showing a rate of development of social skills that has remained quite consistent over the course of the year. There are only a few skills that have been developed that S was unable to do at the beginning of the project including using a table knife for spreading, participating in pre-adolescent play, with such games as tag, ball, etc., and making minor purchases.

Summary:

All of the psychological tests show reduced functioning. The intelligence quotient falls within the Slow Learning range, with relative weaknesses in attention span, number concepts, and visuo-motor performance. Relative strengths are in vocabulary and simple discriminatory tasks. On Three of the tests - Binet, Goodenough, and Vineland - no improvement was noted, but slight improvement was noted on the Bender-Gestalt Test and Syracuse Visual Figure Background Test. On the Bender-Gestalt Tests there were fewer immature drawings, less tendency to dissociate, and a reduced number of perseverations. On the Syracuse Visual Figure Background Test there was greater accuracy, but somewhat more distractibility by background stimuli. The rate of social development was about the same in the pre- and post-test periods.

PEDIATRIC HISTORY: C-2-7

The pediatric history was obtained from the mother, a rather attractive young woman wearing sun glasses. She explained that she had left her regular glasses in the car and couldn't see a thing without her glasses.

Problem: (Mother's report)

The pupil personnel worker had told her the C-2-7 wasn't doing too well in school and it was upon her recommendation that a workup was done at a local hospital for placement in Special Education. It was upon the further advice of the pupil personnel worker that C-2-7 is being worked up currently for possible inclusion in a research project. The mother and son were recent arrivals in the United States. When her son started school abroad, he was said to be hostile and aggressive with the other children. Mother always felt that he was slow, but teacher never really indicated any abnormality. Apparently he progressed fairly well and was promoted at that time. After coming to this country, the mother started working and the woman who took care of C-2-7 did not treat him too well.

When he started school here he was hostile and aggressive, especially with other children. He was hyperactive ("raising hell"). He upset the class routine consistently. His mother felt that discipline in school here was not what it should be or what it had been abroad and perhaps this was in some way responsible for his behavior. The school personnel felt that he was unable to do the work. The mother mentioned that when she worked at home with him he seemed to do well. He still goes to regular school and is in the first grade, (actually he had done this same work elsewhere but the mother felt it would be better to place him in the first grade rather than try to have him go ahead.) He was tested at a local hospital and said to have been found of normal intelligence and that his problems were emotional in origin. Mother didn't follow the recommendations of the hospital. She said that she had some reservations about the program under discussion inasmuch as she didn't know what type of children would be included and she had fears that the children would either by physically deformed or of retarded intelligence.

At this point again, she complained about the living conditions that her apartment house offered and again complained about the woman who originally cared for the boy. She said that she hadn't moved before because she did not want him to change schools. However, she was told that if he is accepted for this program, it would matter where he lives, as he would be picked by bus. At this point, the mother further mentioned that her son was slow in talking and in walking. He had been placed in the day nursery at one year of age when she had returned to work. Immediately following the marriage and after C-2-7 was born the mother lived with her mother and father. She worked and her mother took care of the child for the most part. Both grandparents died within a three month period, when C-2-7 was approximately five years of age and he was unhappy about this as he was quite close to them. He was quite upset and for awhile following this, whenever anyone left the room he thought that they would not come back.

Family Background:

1. Mother's father died at the age of sixty-six following an operation for strangulated hernia.
2. Mother's mother died at the age of seventy-six of cancer of the kidney.
3. Father's mother died of cancer.
4. Father's father is living and well.
5. Mother has two brothers and three sisters living and well.
6. Father has two brothers living and well.

Family History:

Father: Deceased.

Mother: Age twenty-six and in good health. Employed as a secretary. Finished high school, came to the United States one year ago. Throughout most of the interview, although she spoke rather freely, she avoided the direct gaze of the examiner. Her interests are swimming, reading and sailing. All she could say about her personality was that she was irritable. She had problems as a child when she was evacuated from her home from the age of eight to eleven.

She is quite worried about C-2-7. The mother stated she would like to remarry at some point so she could stay home and wouldn't have to work, in addition to which C-2-7 would have all the advantages of having a father.

Marriage: The father and mother had been married for eight years. There was considerable difficulty. Her mother had been against the husband, and things were quite strained when prior to his death they were obliged to live with her parents after the marriage.

History during Pregnancy:

The mother was eighteen years of age when she delivered C-2-7. The pregnancy itself was rather uneventful except for hyperemesis. The delivery was uneventful, C-2-7 weighing five and a half pounds. He was described as looking squashed and the mother heard someone say that he looked peculiar but normal. She remained in the hospital for three weeks, apparently because of difficulty in finding a place to live. The baby was breast-fed for nine months. There was some difficulty in weaning him which was started at six months of age. The mother went back to work when he was twelve months of age.

Past History:

DPT and smallpox vaccination during the first year of life. Salk Vaccine given. He wears glasses for myopia and for strabismus and has been wearing them since the age of two. He had measles and mumps at the age of four and chickenpox at six years of age. He was given tranquilizers on two occasions but has been off all medication for several months now.

Developmental History:

C-2-7 gained well and thrived on breast feeding. Solids were not start ed until after he was weaned. Althoug he had no particular sleeping problem, his habit was to lie awake in bed and jabber away, which he still does. Apparently he dreams a lot, mostly about cowboys and other similar natured activity. He is said to have been slow in development, generally speaking. As to handedness, he is said to be ambidextrous, that is, equally poor with either hand. Toilet training was accomplished by two and a half years of age except for enuresis on and off even to the present day. He has always been reluctant to use other people's toilets and prefers to stand rather than to sit. His attention span is said to be very poor unless he is particularly interested in something.

Present Situation:

He plays with children older or of the same age, does not like to play with younger children or by himself. He is subject to terrific fantasy. He likes to play cowboys; he isn't interested in puzzles or coloring. He can ride a two-wheel bicycle, can't catch ball too well, has poor coordination, is able to count and is said to be able to tie his shoes if he wants to. He can use a knife if permitted to and will sit through movies and TV. Punishment consists of withholding TV, being sent to his room or being slapped. He usually doesn't cry and the mother says she has the impression that he is almost asking to be disciplined. He will fight back although he isn't too good at fighting, and when he is frustrated he grumbles and does not have outright temper tantrums.

Physical Examination: General appearance - C-2-7 is a short boy who wears glasses. He started talking immeidately after coming in contact with the Examiner and didn't stop until he left the room. His speech was normal. He began by saying, "My friend talks crazy; his brain is funny." It is possible that the subject was unable to differentiate reality from his fantasy world. He spoke of being naughty and robbing a bank, and said "My friend is crazy. When he was asleep, he was afraid he might roll off onto the floor." He spoke with feeling and expression and kept his fists clenched throughout the entire interview. The subject said his dreams of giants, gorillas, and little dogs did not frighten him.

In answer to the ambulance story, he said "Somebody's been badly hurt - one of my friends - it was a girl. One of her bones broke." The elephant story was different in that it would be "Painted by Mr. Tooth Decay." He then said that "He caught Mr. Tooth Decay and should have shot him but I squeezed him in my hand", and he clenched his fists even tighter. "So I punched him and he fell out of the window and broke his head to bits", he concluded. To the bird story, he replied "Little baby bird would die."

He was unable to undo the collar button and undid the other buttons with his left hand in a rather clumsy way. His shoe lace became knotted and he was unable to undo it, asking the Examiner to do it for him. When it was time to put his shoes back on, he was unable to tie them. He was able to hop better on his right foot than on his left. He skipped fairly well spontaneously. He was able to identify the various parts of his body. The right eye showed a convergent strabismus, was irritated and had a slight corneal abrasion. He seemed to past point, and not to do it as smoothly with his right. His teeth were carious and the neurological examination was not remarkable except for hyperactive reflexes bilaterally. He was able to distinguish the right from the left shoe and put them on properly. There were indications that he has confused but definite knowledge about both men and women's bodies.

Neurological Examination: Cranial nerves - first cranial nerve was not tested. Second cranial nerve - fundi are normal. Visual fields appear to be intact. He does have very thich glasses which seem to be necessary for any good visual acuity. Third, fourth, and sixth cranial nerves - he had nystagmus on lateral gaze to either side and some on upward gaze. The extraocular movements appear to be intact. The pupils are round and equal and react to light and accommodation. Fifth cranial nerve - corneal reflexes are present bilaterally. The motor and sensory functions of this particular nerve are normal. Seventh cranial nerve - muscles of facial expression are all normal. Taste was not tested. Eighth cranial nerve - he is able to hear the tuning fork and the spoken voice without difficulty. Air conduction is greater than bone conduction. Ninth and tenth cranial nerves - the uvula went up in the mid-line. He is able to swallow without difficulty. Gag reflex was not tested. Eleventh cranial nerve - he is able to shrug his shoulders without difficulty. Twelfth cranial nerve - the tongue protrudes in the mid-line. There is no sign of atrophy or fasciculation. Sensory - Normal for pin prick, touch, vibratory, position, pin prick localization, two point discrimination and double simul taneous stimulation on both arms, both legs, left arm and left face, as well as right arm and right face. Motor- The reflexes are equal and active throughout. No pathological reflexes were found. Motor power seems to be good in all of the muscles. Muscle tone seems normal. Cerebellar - The boy showed good finger-to-nose tests bilaterally as well as heel-to-shin tests. Diadochokinesis was not too well performed on either side. He was able to spin the jack fairly well with his right hand but not at all with his left hand. The boy is righthanded. Station and gait - The Romberg is negative. He can walk on his heels and on his toes without any difficulty. The gait is normal.

Comment: The boy is right-eyed as well as being right-handed. His writing is good for his age, although there is some disorganization. He has a great deal of difficulty in drawing a diamond.

Electroencephalogram: Attitude and condition of patient: alert, cooperative. Fundamental frequency: ranges between 7 and 8 waves per second. Slow waves: a 2 per second spike-dome variant pattern transiently dominated the left occipital output. Fast waves: are not prominent. Amplitude characteristics: high voltage (250 microvolts); irregular modulation. Hyperventilation: does not markedly alter the basic EEG pattern. Impression: Maximum electric abnormality of paroxysmal quality over the left occipital region.

Speech and Hearing Evaluation: Language and Speech Development - C-2-7's language and speech development have been more precocious than his other aspects of development. He sat at eight months and walked independently around twenty-two months of age. He used his first words at about nine or ten months of age and consistently added vocabulary. He began to use phrases around twenty-four months of age. It is mother's impression that he did not fluently express his ideas until around the age of four. She has never questioned his hearing or his ability to comprehend language. She is aware that his conversation is a mixture of fact and fancy.

General Behavioral Observations: C-2-7 has an intent , studious expression, which is emphasized by the big shelled-rimmed glasses. He came willingl to the examining room. He talked incessantly, demonstrating the same vivid imagination and mixture of fact and fantasy that was observed while he was playing with the toys in the waiting room. He has many nervous mannerisms and is constantly in motion. This took the form of twisting around on one foot or the other to wild frantic flailing with his hands and arms. Occasionally he would clench his fists. In telling stories, he grew more and more excited until he almost became hysterical in his verbal output. When he became "wound-up", definite stutter symptoms were observed.

Oral Examination: Teeth are in fair occlusion. There is an overbite. The velum is of adequate length and there is good nasal pharyngeal closure. He can move his tongue in all direction with control.

Articulation: He can imitate all sounds with accuracy and precision. In isolated words he had no articulation errors except a th substitution; for th he usually uses an f or a v. However, in propositional speech, he does not maintain this accuracy and there is a color of infantile perseveration.

Voice: The voice reflects a strong emotional component. Many times he was breathless and gasping; he rapidly changes pitch and inflection. Sometimes he speaks with extreme rapidity and at other times with prolongation and repetition.

Propositional Speech: When presented with three pictures in which to tell a story, there was marked variation in his performance. The first picture was that of shopping at the A & P; for this he gave a very elaborate story about a robbery. He could not volunteer any information about a family picture until direct questions were asked. His comments were very limited and centered about the fact that it was a mother, a father, a boy, and a girl. He did not know what the little girl was doing even though it was obvious that she was kissing the father. The third picture (people fishing) once again provoked a series of tall tales. All the stories were told with frantic gestures. As he got engrossed, his speech became louder and louder. It was punctuated with many giggles and almost hysterical laughter. In the middle of "The Three Bears" tale, he lost track of the story and began telling a story about "my friend". This child has an excellent vocabulary and uses English well. He uses many complex sentences and has the ability to express nuances.

Hearing: This boy has normal hearing. He could repeat spondee words with precision and accuracy. This was also true of a list of PBK words. The following Puretone audiogram was obtained:

Right:	10	5	0	10	15	15
	250	500	1000	2000	4000	8000
Left:	15	5	5	10	15	10

He listened intently while giving the audiometric responses and his responses were consistent and sharp.

Impression: This boy has excellent language comprehension and expression. He is almost a compulsive speaker, weaving fact and fancy. When he gets would-up, his speech is almost compulsive and hysterical. There are many evidences of a stutter pattern in his repetitions and perseveration. He has many nervous mannerisms and is constantly in motion.

Psychiatric Evaluation: C-2-7 had a compulsive need to "make-up" many ego-building stories - tales of prowess against Indians - "one of these cars belong to my policeman who is about to take some money to one of my banks; I've forgotten how many", etc. Most of his stories were about violence he has inflicted on others or what others have perpetrated on him. He was not interested in the dollhouse, clay, toys, etc. In response to Despert Fables (I), he replied, "Mother bird is brighter than Father; if I don't get Father bird away, he will kill all the little ones. I didn't know this at first, but then I got a wolf to kill the Father bird and lost it." To Despert Fables (VI) he replied, "The (elephant's) tail grew. He calls his mother and says he has a trunk in the back too, but you know its really a tail."

The child willingly drew a person for the Examiner. He gave a running comment: "His hair is really messy; this is a friend of mine." ". . . he has one big ear. . . he had some paint so he painted part of this ear green. . . didn't know what to do with the paint."

He had no wishes that he could think of but stated "My wishes go with wild." He circumvented questions regarding his family with irrelevant remarks. As the Examiner and the child came down the corridor, the child stayed behind and pushed at the air saying "stop that." In response to the Examiner's questioning look, he explained that his "horses were actinb rough and were kicking a bit."

Comment: It is clear that this youngster is disturbed. From the information available, he appears to attend to social and physiological functions in a more integrated manner than one might expect.

Psychiatric Re-evaluation: The conspicuous difference between the interview last year and the present one is that C-2-7 no longer had the need to tell such "tall tales". There was less anxiety manifested through the use of his limbs. Also, during this interview, the child went after Bobo, the clown, and spent quite some time knocking it about. It will be remembered that he had no desire to play with toys during the last interview. During this session, his conversations were much more realistic. He agreed that he told "tall tales" last year, but was unable to remember a story he related regarding four year olds in the Foreign Legion.

His first attempt in drawing a person consisted of a circle for the head and a stick figure for the body. He drew an animal that was three times size of the person. He was asked to draw another person; this figure had ears, eyes and mouth and is no longer made as a stick figure. He was disappointed in his signature which was started off well but ended up rather cramped.

The mother is still concerned that C-2-7 has not progressed academically, but she says that he is socially better and that they do not hear him telling so many fancy stories now. She agrees that Special Education is the proper type of experience for her child at the present time.

Comment: C-2-7 has rearranged his internal dynamic structure to some degree this year. A significant change within the past year in his domestic relations may have been a major contributing factor in his increased ability to deal with his emotional problems. He has a greater feeling of acceptance and appears to be less anxious. It does appear, however, that the child continues to entertain a very low opinion of himself and is dealing with his anxiety in more indirect forms.

Stanford-Binet, Form L (Pre-test)(6-6-57)

C.A.: 7--11
M.A.: 5--9
I.Q.: 73

Intelligence falls within the Retarded range, with a mental age of 5-9 and I.Q. of 73. The Basal Age is at Year IV-6, while the Ceiling is at Year VII. These results are in accord with previous psychological testing done 9-27-56, which resulted in an I.Q. of 69.

At Year V all items were passed with the exception of repeating sentences from memory, thus showing a short attention span for immediate meaningful material. S left out major words in attempting to repeat the sentence, and it was obvious that he was relying on rote memory rather than meaning.

At Year VI all items were passed with the exception of copying a bead chain from memory.

At Year VII all items were failed. Visual-perceptual analysis of situations presented pictorially were beyond him. S could not distinguish essential from non-essential elements in the pictures. He could not see similarities between objects. When asked how wood and coal are alike he said: "Looks like wood and like coal." For apple and peach he said: "An apple is orange." Comprehension of problem situations was poor. When asked what he should do if he were on his way to school and saw that he was in danger of being late, he said: "Get my mummy." When asked what he should do if another boy hit him without meaning to do so, he said: "I'd do it straight back. Hit him back hard." His attempts at reproducing diamonds resulted in figures bearing scant resemblance to the stimulus figures.

Stanford-Binet, Form M (Post-test) (5-15-58)

C.A.: 8--10
M.A.: 7--4
I.Q.: 83

The present I.Q. of 83 is ten points higher than the pre-test results, and places the functioning level of intelligence within the Slow Learning range. The four year performance range is from a Basal Age at Year VI to a Ceiling at Year IX.

Two items were failed at Year VII. S was unable to repeat sentences from memory, making many mistakes. In fact, for the first sentence he remembered only the first word. He also failed the sentence building item. When given three words - horse, bigger, dog, - he made up the following sentence: "The horse ran after the little dog and chased him until the dog tripped, and the horse tripped over the dog." He passed the number of finger item, saw the absurdities in pictorially presented material, repeated three digits, and counted the number of times a block was tapped on the table (up to eight taps.)

Two items were failed at Year VIII. S was unable to see the absurdities in situations described verbally. He was also unable to see opposite analogies.

All items failed at Year IX.

Ammons Full Range Picture Vocabulary Test (11-17-57)

C.A.: 8--4
M.A.: 6--6

The mental age obtained on this test is quite close to that obtained on the Stanford-Binet. S failed a number of words ordinarily expected from a child at this chronological age, including vegetable, human, phonograph, transport, customer, sale, manufacturing, skyscraper, cheerful, collision, broadcast, protection.

Goodenough Intelligence Test

Pre-test (6-6-57)

C.A.: 7--11
M.A.: 7--6

Post-test (5-12-58)

C.A.: 8--9
M.A.: 6--6

The first picture shows a boy standing with arms outstretched. A fair amount of detail is presented, including hands and fingers (incorrect number of fingers), shoes with heels, good facial features with eyebrows, teeth, and a large letter "S" on the chest, standing for Super-man. The second drawing, however, is much more primitive. The body is made like a figure eight, with large club-like appendages for arms and legs, no hands or feet, and mouth in one dimension.

Block Design and Coding from WISC

	Raw Score	Scaled Score	Test Age Equivalent
Block Design	3	6	4--10
Coding	12	3	4--10

Block Design A was completed successfully on the first attempt, and Design B was completed on the second. Design C was completed accurately, but in excess of the time limit. The equivalent test age of 4--10 is the lowest possible on this test. The same equivalent test was obtained on the Coding subtest, Form A, where twelve symbol substititions were attempted with no errors. S was extremely slow on this subtest, frequently losing his place.

Bender-Gestalt Test

Pre-test (6-5-57) there were seventeen errors, with two perseverations, four dissociations, two incorrect elements, one unrecognizable, three distorted angles, three rotations, one compression, and one enlargement. Post-test (5-13 58) there were eighteen errors, with three concrete, one dissociation, two incorrect elements, three distorted angles, one rotation, six compressions, and two disproportions. Thus only slight improvement is seen in Bender-Gestalt performance, mostly in perseveration, dissociation and rotation. There were more errors post-test categorized as concrete and compression.

Syracuse Visual Figure Background Test

Pre-test (10-24-57) there were two correct responses to the figure, two background responses, and one perseveration, Post-test (5-12-58) there were four correct responses to figure, three responses to background and no perseveration. As can be seen, only slight improvement is noted on this test.

Tactual Motor Test (10-24-57)

S was able to draw correctly the triangle, both with plain and with thumbtack background. He failed all other designs. There was a marked tendency to concretize the designs. For Bender Figure 6 he said: "It's a spider!" For Bender Figure 4 he said: "It's an airflyer," and proceeded to draw an airplane.

Marble Board Test (11-18-57)

Marble Board 1 was incorrectly reproduced. The first square was correct, but S could not overlap the second. The method of approach was incoherent, while the organization was linear. The drawing shows a square with a rotated "L" protruding from the top. Marble Board 2 was started with a diagonal that extended from the extreme upper left hand corner to the lower right hand corner. It was quite apparent that S was reacting to the design as a whole, rather than seeing it as being made up of parts. His drawing was incomplete, being drawn with one diagonal missing.

Vineland Social Maturity Scale

Pre-test (11-18-57)

Total Score: 62.0
Age Equivalent: 6--3
Social Quotient: 76

Post-test (5-21-58)

Total Score: 70
Age Equivalent: 7--0
Social Quotient: 80

The mother served as informant at both interviews. There is only a four point difference between pre- and post-interviews, showing a very consistent rate of social development. S can do a number of things at this time that he could not do at the beginning of the school year. e is given much greater freedom now, and goes about the immediate eighborhood unattended. He plays competitive exercise games, such as lind mans buff, tag, cowboys and Indians, etc. He does small remunertive work, such as washing the car, returning bottles to the store, tc. He is occasionally left to care for himself, prepares his own ood on these occasions, and is quite responsible. He also disavows literal Santa Claus.

ummary

S shows a reduced level of functioning on all psychological ests administered. Perceptual ability, as shown on the Bender-Gestalt, yracuse Visual Background Test, Tactual Motor Test, and Marble Board est was univormly poor. On the two items from the Wechsler Intelligence ntelligence Scale for Children (Block Design and Coding) S received the lowest possible equivalent test age. Post-test improvement was noted on only one test, the Stanford-Binet, Form M, on which an I.Q. ten points higher than the pre-test was obtained. It should be noted that in the three intelligence tests given since 1956, all using forms of the Stanford-Binet, the I.Q. has steadily increased, from 69 in 1956, to 73 in 1957, to its present level of 83 in 1958. No comparable improvement was noted on the Bender-Gestalt Test (more errors post-test than pre-test), Syracuse Visual Figure Background Test, or Vineland Social Maturity Scale.

While there was marked improvement in this child's general behavior over the course of the year, his behavior was still impulsive, at times uncontrollable, and he was a generally disruptive influence in the classroom. He continued to "tell stories" and make wild exaggerations of his experiences, both actual and vicarious experiences, from television performances, that bordered on the delusional. The general impression is that the primary growth of this child over the academic period was in social growth, especially in ability to get along with peers, and there seemed to be but little change in the types of performances measured by the psychological tests.

PEDIATRIC HISTORY C-2-8

The history was obtained from both parents.

Problem:

At two-and-a-half years of age C-2-8 started having convulsions. The doctors decided that it was both grand mal and petit mal epilepsy. Most of the seizures occurred early in the morning, while he was still asleep. The petit mal consisted of dropping his head forward. For the past three-and-a-half years he has had no seizures and has been on Mysoline, Dilantal and Phenobarbital. Actually he is doing very well except for outbursts of temper, belligerency and hyperactivity. There is some difficulty in keeping him relaxed. Both parents seem to think that the Phenobarbital might actually be excitatory. There is a plan to reduce or to discontinue the various medications. An EEG, which was taken at one point, was normal. Up until six months of age, he is said to have been a perfect baby. From six months of age on he began to whine almost constantly and seemed rather unhappy. He has always been rather active but not abnormally so. He has always been a determined child, doing what he sets out to do unless he was spanked or stood over in order to be sure that something was done or was not done. As a matter of fact it was stated that the main problem really, is that he needs and demands constant individual attention. He started kindergarten at five years of age, went for about a month and then was told that he wasn't ready. He sought and needed too much individual attention. He would do things other than what he was supposed to and so he stayed out for the remainder of that school year. The following year he started in special classes and has been making steady progress since. Of late, he has been asking his parents for help with his work. Before, he claimed that he knew something or could do it without help. His attention can be obtained and held more readily now.

The history was obtained from both parents. The father was rather tall, good-looking and straight-forward. Actually, he did not do most of the talking. The mother was rather obese; it was she who signed the medical release forms and actually did most of the talking.

Family History:

1. Maternal grandmother living and well.
2. Maternal grandfather living and well.
3. Paternal grandmother deceased. Died when the father was nine years of age of tuberculosis.
4. Paternal grandfather died also of tuberculosis.
5. Mother has one brother who is living and well.
6. Father has one brother who is living and well.

There is no cosanguinity in the family.

Family Background:

Father: Forty years of age, in good health, bus operator. Did not finish high school. He was born and raised in the area.

Interests: sports.

Problems: following mother's death, he kicked about from one relative to another.

Personality: (Wife answered.) Very well liked, no enemies. He spent two-and-a-half years in the service before the children were born. Presently, he is at home a good deal of the time. However, he used to go out quite a bit in the evenings to lodge meetings in which he was an officer and quite involved. At different times C-2-8 asked why Daddy couldn't stay home more with him (or at least so the mother said). More recently a closer relationship has been established.

Attitude: at first the father didn't want to accept it. However, once the diagnosis of epilepsy was made, he felt a little better, since he had hear of other people having this illness and who were successfully treated. He accepts it more readily now but occasionally still wonders "why".

Mother: thirty-six years of age short, obese and in good health. Prior to marriage, worked as a beautician. She, too, is from the area and has completed high school.

Interests: she likes to do beautician work, she finds it very relaxing and is quite accomplished in this field. Right now her interests are mainly in the children.

Personality: she is able to find good in just about everybody.

Attitude: at first she was upset, especially before she found out what it was. Now she says that she has resigned herself and is more accepting, feeling that eventually he will be cured. She feels that his education is the greatest concern to her.

Marriage: the parents have been married for fourteen years. It is the second marriage for Mr. and the first for Mrs. They are compatible and are of the same religion.

Siblings: (1) a brother, ten years of age, doing well in school and a good boy. He is very tall and looks older than his ten years. The two boys do a lot of scrapping; however, the brother takes a great interest in C-2-8 and they share things. They do not sleep in the same room as C-2-8 sleeps in his parents' room because they want to keep an eye on him should he have his seizures. There are times when the brother is upset and hurt by C-2-8's difficulties.

Mother's medical history during pregnancy:

It was the mother's second pregnancy. She was twenty-seven years of age when she delivered by an obstetrician at a local hospital. The medical history during the pregnancy was not remarkable at all. The labor itself was quite short. C-2-8 was born of a normal, spontaneous delivery. They both left the hospital within three days (mother had had aphlebitis following her first delivery and so she was discharged earlier). Birth weigh nine pounds, six ounces, twenty-three inches long. C-2-8 was seen within the first twenty-four hours and was placed on bottle feedings.

Past History:

DPT and Smallpox vaccination during first year of life. Has had two polio shots. Measles at four-and-a-half years of age mumps at five, chickenpox at five. There were no seizures for the first three-and-a-half years. T & A at age three-and-a-half. He fell in school once and injured his left kidney which subsequently healed. This fall was not as the result of a seizure. The first convulsion did not occur accompanying a fever.

Developmental History:

There was no difficulty feeding although there was some difficulty breathing through the nose. He ate well, swallowed OK. There was no trouble weaning him. He three the bottle away by himself at nine months of age. He walked at nine months of age and always liked to climb. No history of pica. Was never able to count well, even today. He is right-handed. There was a little difficulty toilet training him inasmuch as the Dilantin was inserted rectally. However, he was toilet trained by the age of four. No enuresis. His attention span has always been short, although for puzzles and putting things together, his attention span is much better. His school progress has been good.

Present Condition:

He can button his buttons except for cuffs and collar, is able to use a spoon and a fork, can bath himself.

Interests: he likes puzzles and games, likes to play with plastic cowboys and animals. He likes to look at books and cut out and paste and color.

He does better by himself or with one person rather than with a group. He is said to be able to ride a bicycle in his yard. He watches TV and goes to Sunday school. He is unable to tie his shoes.

Personality: punishment consists of spanking, rewards or threatening to withhold things from him. He says he is very sorry when he is punished but seems to forget easily and will do the same thing again. He is whining less now than he used to. However, he still does especially when he is tired. He has no difficulty getting up in the morning to go to school but there is a great deal of difficulty at night getting him quiet enough to go to sleep. He handles fighting quite well and father sounded rather proud when he stated that is is somewhat of a bully, attacking children regardless of their size. He does not have temper tantrums when frustrated.

Physical Examination: Blood pressure - 100/70.

General Appearance: C-2-8 went willingly with the Examiner. He knew his name and his age. He has a definite speech impediment.

His three wishes consisted of (1) horse, (2)cat, (3) dog. A good mommy "cooks for you and does nice things for you'. A bad mommy "is real mean to you, screams at you". A good father "loves his boy", and a bad father "screams with his wife". On a desert island he would "take his sister". On a few occasions he would laugh or hum after giving an answer. He was able to name the coins that were shown to him but he did not know their value. Also he was able to count up to ten without difficulty. Skin and mucous membranes: not remarkable. Lymph nodes: not remarkable. Head: not remarkable. Face: not remarkable. Ears: not remarkable. Eyes: not remarkable. Nose and sinuses: not remarkable. Mouth and throat: teeth - twelve over twelve; carious with wide spaces in between. Neck: not remarkable. Vertebra: not remarkable. Chest: not remarkable. Abdomen: not remarkable. Genitalia: not remarkable. Extremities: not remarkable. Neurological examination: he was able to hop on each foot and reflexes were normal.

C-2-8 was unable to dress himself well. He was unable to tie his shoes.

Neurological Examination: Cranial Nerves - the first cranial nerve was not tested. Second cranial nerve - the fundi are normal. Visual fields are normal on confrontation. Third, fourth and sixth cranial nerves - the extra ocular movements are intact. Pupils react to light and accommodation. Fifth cranial nerve - good motor and sensory power is present. Seventh cranial nerve - no evidence for facial paralysis. Taste was not tested. Eighth cranial nerve - air conduction is greater than bone conduction. The tuning fork is heard with equal ease on both sides. The child was able to hear the spoken voice. Ninth and tenth cranial nerves - the child has some defect in speaking. However, it is difficult to place this on the basis of vocal chord difficulty. He is able to swallow without difficulty. In addition the uvula goes up in the midline. Eleventh cranial nerve is normal. Twelfth cranial nerve - the tongue protrudes in the midline. There is no sign of atrophy or fasciculation. Sensory: pin prick, vibratory, positions were all normal. Stereognosis was normal. Two point discrimination and pin prick localization were normal. Reflexes: reflexes were equal and active throughout. No pathological reflexes were present. Motor: motor power was good. Muscle tone was normal. Cerebellar: finger to nose and heel to shin tests were fairly well performed. Diadochocinesis was not too well performed, being better performed on the left than on the right. He had some difficulty in spinning the jack, spinning it better with the right hand than with the left. Fine movements were not well performed. Station and gait: he was able to stand on either leg without difficulty. He could walk on his heels and on his toes. Romberg was negative. The gait was normal. Movements: no extrapyramidal movements were present. Comment: C-2-8 printed his name down the sheet rather than in a straight line. His house is one that is rather immature. It had a very small door with which to get into the house. His diamond was fairly normal.

Electroencephalogram: attitude and condition of patient - alert, cooperative. Fundamental frequency: ranges between 7 and 10 waves per second. Slow waves: occasional short sequences of approximately 4 per second output are observed in all leads. Fast waves: short run of 20 to 22 per second waves are seen in the homologous frontal derivations. Amplitude characteristics: high voltage (150 microvolts); irregular modulation. Additional feature: no definite paroxysmal activity is recognized. Hyperventilation: minimally accentuates the prominence of the generalized slow activity. Impression: moderate generalized abnormal electroencephalogram.

Speech and Hearing Evaluation: Language and Speech Development - According to his mother, C-2-8's general development was more advanced in all areas than her other children. He had the usual baby babble. His first word "dada" appeared at nine-ten months of age. He steadily added vocabulary and was using two word phrases before the age of two. It was the mother's impression that he was talking in short sentences at thirty months of age. It was at this time that his first seizure occurred. His speech declined thereafter, but after drug therapy it began to improve. The mother feels that her son can express his ideas adequately and that he has a good vocabulary. She also felt that he continued to improve in school work and in his ability to figure things out for himself. He recently has become curious and asks the meaning of words he hears or reads. The child has never had any speech therapy.

General Behavior: C-2-8 is a friendly, outgoing child, who related well to the Examiner. He eagerly walked down the hall inquiring what they were to do. He cooperated well in all the various tasks set before him. He laughs and giggles easily and many things amused him.

Oral Examination: Upper jaw is somewhat narrow and the hard palate has a high, narrow vault. The soft palate is of adequate length and lifts evenly. There is good nasopharyngeal closure. Tongue is controlled well and can be protruded in the midline without a tremor. He can move it from side to side and in various places with fair precision. He can imitate rapid, successive tongue placement, with or without vocalization. Teeth are rather short and there is a wide space between the upper incissors. Occlusion is adequate.

Articulation: Single words are well articulated. He says them with more emphasis and precision than is manifested inconnected discourse. However, speech is intelligible. The only defective sound is the s and z. Apparently he once had a lisp and has not learned to jet an air stream for the s. Blends, with the exception of the s blend, are good.

Voice: voice is clear and resonant when he projects. He tends to talk in a monotone without much inflection.

Propositional Speech: C-2-8 verbalizes easily. However his utterance is not consistent. At times it is quite clear and quite precisely articulated. He tends to draw out his speech, prolonging vowels and changing stress and phrasing. As a result, it is difficult to follow him. A defective sibilant and the prolongation tend to make his speech sound different. He talks in fairly long sentences if it is appropriate and is using compound as well as complex sentences. He employs a variety of verb tenses.

He eagerly told a story about the pictures. He enjoyed it and went into some detail. He told the story of the Three Bears with quite good organization and with a variety of dramatic touches. He showed more animation in his speech while telling these stories than was observed in most conversation.

The child's hearing is essentially normal. He repeated the spondee words with great surety. He also gave back the PBK words with accuracy. This was further confirmed by the PureTone test. The following audiogram was obtained:

Right:	0	15	5	15	20	20
	250	500	1000	2000	4000	8000
Left:	5	15	10	20	20	15

Impression: this child has relatively good language comprehension and expression. Speech is made somewhat deviant by the drawl and prolongation of vowels, as well as by the somewhat deviant stress pattern. It is further colored by a defective s.

Psychiatric Evaluation: this pleasant looking youngster's manner was quiet and he willingly came to the playroom. He gave his birthday correctly adding, "I'll be nine on my birthday". He took every chance to show his knowledge, but he had difficulties. For instance, he gave the difference between an apple and a ball after ten minutes thought and then with prompting; he was unable to suggest a way in which they are similar. He showed awareness of his limitations by saying very matter of factly "that's the way it always is at school"; and added with apparently genuine enthusiasm "you know, I'm lucky, I'm going to summer school".

There was little other verbal communication of feeling. C-2-8 did remark, when asked about his worries, that he worried over whether his dreams would come true. There was a very short attention span. Although he readily accepted the idea of drawing a boy, girl and himself, he drew a house and then turned to a wind-up train and then quickly to the guns. He returned to the drawing, only to talk about wanting a sister and to mentioning a girl friend;

"but she won't marry me", he added.

His answers to questions were often irrelevant and many of his remarks were made in the form of a stream of consciousness.

Comment: this child's anxiety and aggression may be a secondary reponse to felt limitations of speech and visual perceptual difficulties.

Psychiatric Re-Evaluation: C-2-8 willingly joined the Examiner in the playroom. His slight lisp becomes more prominent when he is excited. He has an almost continual flow of conversation with a fair amount of it running together. For example, he said ". . .if my mother and I lived in two hundred houses we would need two hundred pounds of food and two hundred dollars." This was said with a cheerful beaming countenance and laughter characteristic of a much younger child. His play with the toys became more organized during the last half hour of the interview, but he continued to play by himself.

He quickly drew a stick-figure for the Examiner. Although the man is smoking, there is no cigarette or pipe present. He named this picture "Dad". When asked to draw a diamond, he drew a diamond bracelet. When an example was placed before him, his second of three attempts was what was asked for. The first and third attempts were done by drawing each line separately.

Conversation with parent: his mother stated that "everywhere I look he has improved." She feels that the positive aspects of the child's behavior had not been praised enough in the past and that the child had been "living up" to his bad reputation. There was much praise for C-2-8's teacher and the school conferences that she attented. The mother also feels that her child has learned to respect people of all ages; this attitude seems to have been missing in the past.

Comment: the parents have accepted C-2-8 as an individual, no longer comparing him with their other children. As a result there appears to be less anxiety in the child.

Stanford-Binet, Form L (Pre-test) (4-7-57)

C.A.: 8--10
M.A.: 6--2
I.Q.: 70

This child is functioning at a retarded level. The mental age is 6-2 and I.Q. 70. The basal Age is at Year VI. The present test results are in agreement with psychological testing done 10-15-53, when a Stanford-Binet I.Q. of 70 was obtained. Thus it can be seen that the rate of intellectual development is quite constant.

At Year IV-6 all items except that dealing with materials was passed. In this item the child is asked the material certain things are made from. When asked what a dress is made of, S thought for a long interval, and then said: "A blouse." Repeating the question did not omprove the answer. When asked: "What are shoes made of?" S responded with "Wood." When asked if the shoes he was wearing were made of wood, he answered in the affirmative. This latter is probably a perseveration from the first question which he answered correctly, namely, "What is a chair made of?"

At Year V all items were passed with the single exception of copying a square. Each attempt made by S resulted in a figure more nearly resembling a rectangle than a square.

At Year VI S was unable to copy a bead chain from memory. He grasped the idea that different beads were to be used, but did not differentiate the very simple pattern used at this age level.

At Year VII only one item was passed, picture absurdities. This was one of the easiest tests at this age level for the children in this project. Attention span and memory for immediate material (repeating five digits) was not up to age level. Abstract ability also represented a weakness, as shown in an inability to see opposite analogies, comprehend problem situations, or see similarities. For instance, when asked in what way wood and coal are similar, S replied: "Coal is black." No further elaboration was obtained. When asked what he should do if another boy hit him without meaning to do it, he replied: "Tell my mother." He was unable to reproduce a diamond.

At Year VIII S was able to remember the main aspects of a story that was read to him and vocabulary was at chronological age. Several times during the test he responded with a word and then spelled it. For instance when asked what an orange is, he replied: "What you eat. E-A-T, Eat." He seemed very pleased with himself when he could spell a word.

Stanford-Binet, Form M (Post-test) (5-23-58)

C.A.: 9--10
M.A.: 6--4
I.Q.: 64

There is only a six point difference between this examination and the pre-test, the present I.Q. being 64, which, again, places S in the range of the Retarded. The performance range is three years, from a Basal Age at Year VI to a Ceiling at Year VIII.

At the Year VII two items were passed, giving the number of fingers, and sentence building. S was unable to repeat sentences from memory, see picture absurdities, repeat three digits reversed, or count the number of times a block was tapped.

All items were failed at Year VIII.

Ammons Full Range Picture Vocabulary Test (11-27-57)

The mental age was ten months greater on this test than on the pre-test Stanford-Binet, Form L. The following words, expected successes at this age level, were failed: vegetable, human, transport, customer, sale, manufacturing, skyscraper, cheerful, collision, broadcast, uniform, protection, and cleanliness.

Goodenough Intelligence Test

Pre-test (4-7-57)	Post-test (5-12-58)
C.A.: 8--10	C.A.: 9--10
M.A.: 5--9	M.A.: 6--5

The first drawing was very poor, showing a huge balloon-shaped head with arms and leg attached, huge fan-like ears, and a minimum amount of detail. The post-test was little better, showing, in addition to the pre-test, an attempt to reproduce teeth, nostrils and a hat flying through the air above the figure. When the ratio of mental age to chronological age is taken into consideration the post-test drawing is even poorer than the pre-test.

Block Design and Coding from WISC

	Raw Score	Scaled Score	Equivalent Test Age
Block Design	1	3	4--10
Coding	7	3	4--10

Design A of the Block Design was completed on the second attempt, just short of the time limit. S was unable to construct any other designs, becoming confused by the colors. Nine substitutions were attempted on the Coding, Form B, with two errors. Both subtests received the lowest possible equivalent test age on this test.

Bender-Gestalt Test

Pre-test (5-7-57) there were twenty-one errors, including three immature, two perseverations, five dissociations, one closure, one incorrect element, three unrecognizable, three distorted angles, one compression, one enlargement, and one disproportion. Post-test (5-12-58) there were twenty-one errors, including one concrete, three perseverations, three dissociations, one closure, four incorrect elements, three distorted angles, three rotations, two enlargements, and one disproportion. Fewer errors were made post-test which were categorized as immature, dissociation, unrecognizable, or compression. More errors were made post-test which were categorized as concrete, perseveration, incorrect elements, rotations, and enlargements.

Syracuse Visual Figure Background Test

Pre-test (10-24-57) there were two correct responses to figure, two background responses, and nine perseverations. Post-test (5-12-58) there were four correct responses to figure, two background responses, and four perseverations.

Tactual Motor Test (10-24-57)

S was completely unable to grasp the notion of this test. He felt the design behind the curtain for the minimum amount of time, and then, when asked to draw what he felt, proceeded to draw men. This test was attempted again a week later, with essentially the same results.

__Marble Board Test (11-18-57)__

S constructed Marble Board 1 by filling in every available space with marbles. S's drawing showed no grasp of the basic pattern, being composed of disconnected lines. Design 2 was reproduced in a similar manner, and the drawing shows a background with scattered dashes supposedly representing marbles.

__Vineland Social Maturity Scale__

Pre-test (11-18-57)		Post-test (5-13-58)	
Total Score:	60.5	Total Score:	71.5
Age Equivalent:	5--9	Age Equivalent:	8--5
Social Quotient:	63	Social Quotient:	86

The mother served as informant at both interviews, and indicated that she feels much progress has been made. She said: "I think he is improving, especially since we cut down on phenobarbital." At the first interview she said that she felt that, in many cases, S's lack of ability might be due to her over protection or failure to provide opportunity, while in the second interview she indicated that she has been trying to give S considerably more freedom.

S can do several things now that he could not do at the beginning of the year. He goes about the neighborhood unattended, at least so far as visiting friends' homes and the local store. He goes to school unattended, while formerly his mother accompanied him. Going to bed was a problem for everyone concerned at the beginning of the year, S resisting sleep, but now he goes to bed unassisted. He also uses table knife for cutting, bathes himself unassisted, cares for himself at the table and is allowed to make minor purchases.

__Summary:__

Both tests of intelligence on which there is a pre-test and post-test available for comparison (Stanford-Binet, Goodenough) show a retarded level of functioning. Both tests also show a slightly lower level of ability post-test. Little change was noted on the Bender Gestalt Test, twenty-one errors being made both pre- and post-test. Slight improvement was noted on the Syracuse Visual Figure Background Test, where there was somewhat greater accuracy of perception and less perseveration. The most improvement as shown by the psychological testing was on the Vineland Social Maturity Scale, where the post-test social quotient was twenty-three points higher than the pre-test, showing an accelerated rate of social development. Social change was also observed in the classroom. At the beginning of the school year S was considered a behavior problem, defying the teacher and making many aggressive remarks to her. By the end of the year he was very cooperative, and little aggressiveness remained.

PEDIATRIC HISTORY C-2-9

Problem:

The information was obtained from the mother who is rather large, elderly woman with white hair, who wears glasses. She seemed rather pleasant throughout the interview. She spoke quite freely and of significance was the fact that she spoke with very homey expressions.

The problem as stated by the mother is the C-2-9 is unable to learn to read and write. As a result of this he has a tendency to stand off from the rest of the children in school and elsewhere. He is very unsure of himself, never takes the lead, has to be told what to do, apparently has no confidence in himself. The latter points are true, especially in reference to other children. However, he does not seem to show the same manifestations, at least not to the same extent, with his mother.

If he is out playing (or as in the waiting-room while playing with blocks), and he notices his mother or father, he will stop and sort of look to them to see what their reaction will be. He apparently is freer with his mother than he is with his father. He likes to play"pretend machinery". For example, he pretends he is an airplane or a tractor or some other moving applieance. Sometime this sort of play gets him so excited that he has difficulty falling to sleep at night and he will continue to talk about it even the following day. Other times he seems to get carried away with pretty flowers or trees or a mountain or a sunset. His facial expressions are also said to be so different from other children; the fact that he takes notice of his surroundings and is so much aware of them makes his mother more appreciative of his having some positive qualities. "If only they can be brought out!" He is said to refuse to or to be unable to concentrate and therefore is a problem at school. He looses interest quite readily, has an extremely short attention span and again this is either because he won't or cannot concentrate. If any type of pressure is brought to bear on him he gets nervous and upset and at this time his hands begin to quiver; otherwise he does not have this quivering motion of his hands.

In discussing some of these problems, the mother said that she really never noticed (I wonder if it wasn't more a refusing to notice) many of the aforementioned difficulties prior to starting school. It was at this point that the mother stated that she had had a son, fifteen months younger than C-2-9, who had leukemia and while she was so occupied with this son, she wondered if perhaps C-2-9 hadn't been neglected to some extent by his parents. This lasted for six months at the end of which time the boy with leukemia died. C-2-9 was about three years of age at the time. In addition to the illness of his brother, he was sort of left out of things because his baby brother had to be cared for too. This preoccupation with both the baby and the son with leukemia was also given as a possible explanation for why the mother had not perhaps noticed anything unusual about C-2-9.

C-2-9 was said to be always a "quiet one" and never gave them any trouble by "getting into anything". His younger brother has always been the leader between the two of them and always tells C-2-9 what to do. It was he actually taught C-2-9 to dress himself (mother says she was unable to do s as he either refused to do something or, if he had difficulty she would omatically do it for him). He seems to be quite dependent on his brother is the leader in getting both of them into mischief. C-2-9 is said to very happy to follow his brother and doesn't seem to resent the arrange- t whereby his brother is the leader and he follows. He is said to give up te easily.

ily Background:

1. Maternal grandmother died at the age of sixty-nine of a heart attack following surgery for an ovarian cyst.
2. Maternal grandfather died at the age of seventy-two; he was burned to death in a fire.
3. Paternal grandmother died at the age of sixty of "dropsy".
4. Paternal grandfather died at the age of seventy-three of a stroke.
5. Mother had three brothers. One died following a heart attack, the other two are living and well.
6. Father has four brothers and five sisters. One brother died of tuberculosis which he apparently contacted during the First World War. The other brothers and sisters are living and well. No other significant information of diseases.

ily History:

Father: forty-eight years of age and in good health. He is a dairy- . Finished school through the seventh grade. Currently the family lives a farm.

Interests: father loves to tinker with machinery or electrical devices. ner says she doesn't see why he sticks to dairying when he could be a very d mechanic.

Problems: there were none in particular except perhaps that of being of a large family of ten who was very poor but happy.

Personality: father is said to be very hard to get to know. He is quiet, does not have anything to say for himself.

Attitude toward boy's problem: he would do anything to get him start- and straightened out. At first, however, he refused to accept that anything wrong with C-2-9. He would get very angry, didn't want to admit to him- the possibility. Now he is able to admit this (at least for the past) and is willing to permit diagnositc tests and placement in special class-

Father takes an active interest in the children. Apparently he lives his children and in his home.

Mother: age fifty and in good health. She taught school before her riage; has done nothing since except raising a large family. Completed ol through the seventh grade and then Teacher's College for a certificate to teach.

Interests: mother says that she does not have too much time to do anything but take care of the home and the children. She still, however, teaches Bible school.

Personality: she just accepts whatever comes along. (She laughed and wanted to know what I thought about her personality.)

Problems: mother says that she comes from a divorced family and the six children were scattered about pretty much. She said she had a good home but it was a rather lonely childhood. She was further quite upset when one of her children died of leukemia. And then she just added that she has the usual problems one has in raising a large family and educating them, seeing that they are brought up properly, etc.

Attitude: at first she worried a great deal. She wondered if he did not have the ability to make a good citizen and get along. However, now she sort of seems quite sure that he is capable of making a good citizen. She added rather philosophically that "somebody has to do the menial difficult and unpleasant work".

It would appear that the mother never had any help with the home or the children. (When asked about this, she did not give the information with any rancor.) She further stated that all her children come to her with their problems and ask her advice - things like doing homework and what they should do, etc. She feels that she is more sympathetic or rather she said that perhaps the children came to her rather than her husband because they found her to be more sympathetic than he. She added that even the father tends to lean on her and comes to her with most of his problems. One of the children once asked: "What would become of the family if anything should happen to you?"

Marriage: they have been married twenty years. It is the second marriage for the father. They have the same religion and apparently the marriage is quite compatible. As previously stated the mother has to handle all of the family troubles and make the decisions for the family.

Siblings: the mother had thirteen children in all, ten of whom are living at the present time.

Ages: sister, thirty years of age happily married and in good health. Has not been in the home for the past eleven years. Brother, twenty eight years of age, married, in good health and out of the home for the past nine years. Brother, twenty six years of age, married and in good health. He has been out of the home for the past two years, although prior to that he was in and out of the home, having been in the Service. The mother mentioned that she is having somewhat of a problem with him because he is alcoholic. She loves him and said that he loves C-2-9 and vice-versa and they get along very well. Brother, twenty-four years of age, in the Air Force and out of the home for the past three years. He is just wonderful. The children all love him and he loves them as a real brother. The above named children are actually the children from the father's first marriage.

Brother, eighteen years of age, living at home and in good health. He gets along well with the children. Sister, sixteen years of age, living at home, still in school and doing quite well. Both this sister and the eighteen year olf brother don't seem to worry C-2-9 and seem to protect him. Brother, fourteen years of age, living at home and doing well; he is said to be very critical of C-2-9. It was he who first pointed out why or how C-2-9 was different from other kids. He tries to make him stop some of his foolishness, tries to teach him. A brother who died at age seven of leukemia. C-2-9 does not seem to remember him and does not say very much about him. He used to talk about him and ask about him whenever the parents said they were going to the hospital to visit anyone since the brother went to the hospital and never returned. A brother, ten years of age, doing well, gets along fine with C-2-9. Subject, age eight. A brother, six years of age, extra good in school and learning and he is said to be "sharpest of the young ones". C-2-9 depends on him a great deal and is very concerned about him and tries to protect him when other older children might pick on him. The mother says C-2-9 seems to love his brother more than he does his mother or father. This is not true of the part of this brother, however.

The family lives on a farm and only recently the parents took a Welfare baby, a little boy one week ole (father is said to be home this afternoon baby sitting). It is interesting to note that previously, earlier in the interview, the mother mentioned that her husband couldn't come out with her because he had to work - perhaps both of these are factors as there are many things to be done on a farm which could not necessarily be put off.

There is a dog who is everybody's. C-2-9 has cats which he likes better and especially the kitten and is said to love anything that is small and little such as a kitten.

Mother's Past History Including Pregnancy and Delivery:

The mother had one miscarriage at three months. Does not know what the cause of it was, where it occurred along the line. She had one infant who died at six months of age of whooping cough; both of the above were from her first marriage. Of her present marriage, one baby died during the first day, apparently from birth trauma. She was forty-two years of age at the time she delivered C-2-9 and is said to have been quite upset during the pregnancy. She felt at this time that there were just too many children closely together; her mother died at this time as well. The son who later died of leukemia, seriously burned himself and required hospitalization. As a result she was very tense and nervous throughout the pregnancy. In addition she sort of hoped that C-2-9 would be a girl. She said that she was very difficult to live with at this time and came quite close to "cracking up". (She questioned whether this might not perhaps have had an effect on C-2-9 being so nervous.)

The obstetrician delivered C-2-9 in a hospital. C-2-9 weighed ten pounds and ten ounces and the labor was said to be quite difficult for her, longer and harder than the previous ones. The birth itself was unremarkable except that she said she always felt C-2-9 was born "sideways". She was unable to see him for the first twenty-four hours because she said the nurses said they were afraid he would choke because of a great deal of mucous. He was not breast fed; he sucked well and was quite vigorous and active as an infant. He left the hospital together with his mother.

Past Medical History:

DPT and smallpox vaccination during first year of life; has had two polio immunizations.

Had whooping cough at four months of age; apparently he was very sick with it; although he was not hospitalized he was ill for about six weeks. He had chickenpox at one year of age which was very serious and seemed to be more like smallpox rather than chickenpox. He had "asthma" at about approximately one and a half years of age. This was described as difficult breathing and turning blue. Everytime he would become upset up unto the age of three or four, he would apparently have one of these attacks. It was at this time, after the first attack, that he became quite nervous and he began jerking and couldn't control his hands. The mother describes what she thinks was a convulsion; he seemed to have jerked all over; his teeth clicked. This too, was at a time during one of his "asthmatic" attacks. He was given paragoric on one or two occasions for these attacks and apparently this seemed to make him more nervous. He has not had one of these attacks for the past three years. Currently he is on no medication and never had any medicine before these attacks. The father is said to have gotten quite upset and excited every time C-2-9 had one of these attacks because of what happened to the son who had leukenia.

Developmental History:

C-2-9 is said to have cried a lot for the first three months. He was always tense and nervous and not being able to relax even when asleep. Because of this he was picked up quite a bit. His bottles were propped about half of the time because of the needs of the rest of the family. He had no difficulty swallowing, solids were started at the usual time. Apparently there was normal growth and development in terms of sitting up, standing, walking, etc. There never seemed to be any difficulty with speech, any delay. He was able to follow instructions O.K. He is right-handed and always was although one brother is said to be left-handed. The mother feels C-2-9 has some visual difficulty; she was unable to say how or why. He has a very short attention span. Toilet training was prolonged and only was accomplished when his younger brother was completely toilet trained. This happened at about three and a half years of age for the patient. There was never any history of thumbsucking, head banging or rocking. He is a sound sleeper has never had any difficulty sleeping.

Present Condition:

He always seems to be quite happy, eats well, sleeps well. Prefers to play with smaller children and prefers to run around and engage in physical activity like making believe he is a machine than do more sedentary type activity. He is said to be able to color O.K. for a short while; likes to be read to but again only for a while. Up until one year ago, he would not watch TV.

He is a little better on that score now. He is said to be able to sit through Sunday school, loves music and has learned the words to songs quite easily. He can repeat the Lord's Prayer and is able to recite the Pledge of Allegiance. He has an uncanny ability for recognizing infrequently traveled roads and has quite a memory for fine small details. He is able to button his buttons and tie his shoes. He is sort of messy at the table and is unable to use a knife. Mother feels perhaps a lot of this is due to the fact that this is done for him. Although he bathes himself he is unable to get his ears and neck clean. He has never been punished too much and when he is, he cries and is very unhappy and wants to make up immediately. He has to get real mad before he will fight. He just cries and shouts. Usually he will avoid it as much as possible. When frustrated he does not have a temper; he says that he will have a spell. He nags quite a lot and whines.

Physical Examination: Blood pressure 100/60

C-2-9 came with the Examiner without any hesitation or difficulty. He had a whistling S which was quite noticeable when he said 66 referring to his weight. He speaks haltingly and screws up his face quite a bit and makes other grimaces when he is thinking or responding. He was able to name his friends at school. He said he likes to play with toys and build and is able to color. He thought a great deal about his three wishes and said he couldn't think of any. Good mummy treats you good, a bad mummy hurts you. A good daddy doesn't hurt you, a bad daddy "he hurts you, slaps you". On a desert island he would take one of his school friends. In response to the ambulance story he said "Someone got hurt, a man was in a car wreck - hurt his back real bad." To the bird story he said the baby bird would die and wants his mummy and daddy. Bad dreams make you get scared because real bad things happen. However, he was unable to say what some of these bad things were. He wants to be a farmer when he grows up and was able to mention some of the various things that a farmer does. He recongized a penny but called a nickel a dime, gave no response when shown a dime and said a quarter was a dime. He can count up to thirteen, skip fourteen, then he can count well up to thirty. He knew the days of the week and did not undress with too much dexterity. There were wide spaces in between. They were quite carious and he had a high arched palate. Neurological examination was not remarkable. The child was able to hop on either foot equally well and he was able to skip. He had quite a bit of difficulty in buttoning his trousers and in zipping the zipper. There were no gross or fine tremors seen with his arms outstretched. There was some perseveration in his finger-to-nose test which was not performed too well. He did some things with his right hand and foot and others with his left. He was unable to pick out his right shoe and it was only after trial and error that he did. He wore moccasins so that he did not even have to make an attempt to tie his shoe laces. The remainder of the examination was not remarkable.

Neurological Examination: Cranial Nerves - The first cranial nerve was not tested. Second cranial nerve - Visual fields appeared to be normal in confrontation. The fundi were also normal. Third, fourth and sixth cranial nerves. The boy had a slight nystagmus on lateral gaze to either side. No strabismus was noted. Extra ocular movements were all intact. Fifth cranial nerve was normal as was the seventh, ninth, tenth, eleventh and twelfth. Sensory - Pin prick, vibratory, touch, position and stereognosis were all well performed. Two point discrimination, pin prick localization and extinction phenomena were all normal. Reflexes - Reflexes were equal and active throughout. No pathological reflexes were present. Motor - Muscle tone was good. The motor system appeared normal except for coordination. Diadochocinesis was not well performed. Station and Gait - Station and gait were normal. Movements - there was a fine tremor, particularly in movements of the right hand. Comment - This boy had difficulty in performing other than very simple tasks. He was unable todraw a diamond and he could not draw a house very well. In addition to that, the printing of his name is not very well done. He has a great deal of difficulty in differentiating right from left, continually calling the right the left, and the left the right. He is right handed, but left eyed.

Electroencephalogram: Attitude and condition of patient: alert, cooperative. Fundamental frequency: ranges around 10.5 waves per second. Slow waves: none of brain origin. Fast waves: are not prominent. Amplitude characteristics: average to high voltage (100 microvolts peak); regular modulation. Hyperventilation: Generates no slow waves. Impression: Within the range of normal variation.

Psychiatric Evaluation: C-2-9 gave his age correctly and was friendly, cooperative but quite shy throughout our time together. He left his mother easily and walked upstairs with the Examiner demonstrating a rather straight-legged gait. At all times during the interview he was in need of guidance as well as permission to involve himself in the play activities. For example, he took a few tentative punches at Bobo until encouraged to hit out, at which point he did so, catching on to the explanation as to why Bobo remained upright. He shoed this by tossing Bobo into the air and tipping him so that we both could hear the sand move from one side to the other. After a while, in quite a normal fashion, he said "I'm getting a bit tired of this now", but added "may I do" such-and-such now?

He drew a very poor star and said as much. While drawing,the tremor mentioned earlier was in evidence. It did not seem a true intentioned tremor because it was present before, during and after the activity. Richard told me, on questioning, that it comes and goes. It appeared before he ever started school but has, at no time, affected more than his two hands, nor has the trembling become worse. The tremor is unrelated to the time of day. In answer to other questions of information, he stated that his birthday "is just half past". Knowing that his birthday was about two weeks ago, perhaps what was meant was, "it has just passed". There was a definite degree of mental retardation and he was disoriented for time.

When asked two of the fables, he stated that the baby bird "went to another tree", and when asked what was different about the elephant, he replied that there was "another baby with the elephant."

When asked about his family, he named four brothers and where they were.

The child dreams some but he did not elaborate except to say that there were many bears in his dreams, and sometimes he saw shadows on the wall that scared him.

After the Examiner defined what wishes meant, he answered by suggesting items which were around him in the play room, despite the Examiner's encouragement to think of other things, perhaps at home. He gave (1) toys, (2) cars, (3) trucks.

Comment: C-2-9 was a very sweet passive youngster. It took very little in the way of guidance and permission for him to move forward towards people and things. There was a marked lack of perceptual and conceptual development. For example, he could hook trucks together if once given the idea that this could be done. There is an emotional problem here and the Examiner's observation seemed to confirm those of others, including the mother who stated that he has been somewhat overlooked in the family constellation, particularly because his means of adjusting to his family took the form of passivity and conformity, which did nothing to arouse interest and attention by his family.

Psychiatric Re-Evaluation: C-2-9 was less at ease and more passive in the playroom during this interview than previously. He limited his play activities to hitting Bobo's replacement, but this activity was performed with some uncertainty. There was no spontaneity in his conversation. When asked about school his face lit up and he said, "I can write my name, and I can do arithmetic, too. I like arithmetic." There was a slight lisping quality to his speech, but it was not remarkable. When asked if anything was different at home, he said "No".

His three wishes included a horse, a cow, and a cat. When asked to draw a picture of a person, the child drew a boy. The boy he drew had a head, body, and legs, but the ears and arms were missing, and the drawing was quite primitive. It was made with considerable muscular tension as though he found it hard to control the direction of his lines. In a very pleased fashion he printed his name.

Conversation with mother: The child's mother was her usual calm, friendly self. She stated that the child has improved a lot in getting along with people, that he is more independent and can dress himself, etc., without requiring as much or any help. She noticed that her son had better drawings at home and stated that "he must have been a little excited today". His drawings at home contain arms, but in most respects are not too different. She was pleased to see that he was spelling, stating that this was something he could not do before this year.

She resented the fact that she could not spend time with her children. There seemed to be some difficulty in trying to work up a schedule whereby more attention could be given to the child. His mother stated that "he has the best memory of any child I know and is much more observant than his brother." She described how sensitive and appreciative he is of nature. He can describe all the flowers, the sunset, etc. "He sees the beauty in everything" she concluded.

Comment: C-2-9 seems to have made definite progress in the academic setting but he continues to lack confidence in expressing himself perhaps because of the lack of opportunity to practice in his home environment. In the playroom setting he was more passive than previously.

Stanford-Binet, Form L (Pre-test) (6-25-57)

C.A.: 8--0
M.A.: 5--6
I.Q.: 69

Intelligence is within the Retarded range. The mental age is 5--6, and I.Q. 69. The Basal Age is at Year IV, while the Ceiling is at Year VIII. Thus the performance range is over a six year period. The mental age is retarded two and one half years below the chronological age. The present results are in agreement with testing done 11-10-55, when an I.Q. of 66 was obtained.

At Year LV-6 S was unable to give the materials of which several very common articles are made. For example, when asked what a dress is made of he said: "Wood." This latter was perseverated from a previous item. Giving the materials of which familiar objects are made is a test of language comprehension and of information. S was also unable to follow directions in carrying out three commissions, leaving out one of the tasks assigned to him. It should be noted that giving the materials of common articles and the ability tc carry out three commissions are the two most difficult items at this age level for cerebral palsied children known to have central nervous system dysfunctioning.

At Year V S was unable to copy a square. This test requires an appreciation of spatial relationships and the ability to make use of visual perception to guide a rather complex set of motor coordinations. The figures produced by S became progressively worse the further removed they were from the stimulus. He was unable to fold a paper triangle, producing instead a paper folded in a very haphazard manner. The motor coordinations involved are not so complex as those required in the drawing of a square, but the paper folding involves the imitation of remembered movement. These are the two items at this age level usually found most difficult by cerebral palsied children known to have central nervous system dysfunctioning.

At Year VI vocabulary was failed. Five words are required to pass at this level, and S successfully defined only four. Verbal concepts were poorly developed. For example, when asked to define eyelash he said: "When your eye gets bad you have to wear it." For gown he said: "Some kind of machine." For muzzle he said: "Some kind of round thing." At this age level he was unable to copy a bead chain from memory. He grasped the notion of alternating forms, but could not differentiate shapes.

At Year VII S was successful with only one item, repetition of five digits. This is the item which was found easiest by the children in this project. Comprehension of problem situations was poor. When asked, for example, what he should do if he accidentally broke something which belonged to someone else, he said: "Pick it up." When asked what he should do if he were on his way to school and saw that he was in danger of being late, he said: "Get out of it." S could not see the absurdities of situations presented visually, nor could he perform at the abstract level required in seeing the similarity between two things. The diamonds produced were very poor, having little relationship to the stimulus figure. He was aware of the need for angles, and carefully drew rather peculiar looking "ears" to satisfy this need.

Stanford-Binet, Form M (Post-test) (5-23-58)

C.A.: 8--11
M.A.: 7--0
I.Q.: 79

The I.Q. obtained on this test is ten points higher than that on the pre-test, which places the functioning level of intelligence in the Slow Learning range. The four year range of performance was from a Basal Age at Year VI to a Ceiling at Year IX.

At Year VII S was able to see the absurdity of situations presented pictorially, build sentences from three words that were given, and count the number of times a block was tapped on the table. He did not know how many fingers he had, could not repeat sentences from memory, and could not reverse three digits.

At Year VIII S could see the similarities between two things, the absurdities in situations described verbally, and could not only name the days of the week by rote but could also give the day coming before certain specified days. Comprehension of problem situations was poor, however, as was opposite analogies.

At Year IX all items were failed.

Ammons Full Range Picture Vocabulary Test (11-27-57)

The mental age obtained on this test was quite consistent with that obtained on the Stanford-Binet. The following words, expected successes from a child of this chronological age, were failed: vegetable, customer, fuel, sale, island, laundry, razor, cheerful, broadcast, uniform, and safe.

Goodenough Intelligence Test

Pre-test (6-25-57)	Post-test (5-12-58)
C.A.: 8--10	C.A.: 8--10
M.A.: 5--9	M.A.: 5--9

Both drawings were quite similar, the main difference being in the slightly greater detail in the post-test drawing, which showed hair and ears, details left out in the pre-test drawing. Both were very crudely drawn, with a box-like trunk, buttons down the midline, no arms, and very long pipe-stem legs.

Block Design and Coding from WISC (6-25-57)

	Raw Score	Scaled Score	Equivalent Test Age
Block Design	0	0	4--10
Coding	0	0	4--10

In attempting to reproduce the block design S used the wrong colors, choosing whatever was closest. Even when the colors were pointed out to him, he could not construct the designs. He attempted four substitutions on the Coding, with four errors. He skipped several squares in the process, and kept losing his place. The equivalent test ages obtained are the lowest possible.

Bender Gestalt Test

Pre-test (6-25-57) there were fifteen errors, with three immature, three dissociations, three incorrect elements one unrecognizable, three distorted angles, one compression, and one disproportion. Post-test (5-12-58) there were sixteen errors, with two perseverations, four dissociations, three incorrect elements, three distorted angles, one rotation, two enlargements, and one disproportion. Little improvement was noted on the post-test.

Syracuse Visual Figure Background Test

Pre-test (11-18-57) there were five correct responses to the figure, six background responses, and no perseverations. Post-test (5-12-58) there were nine correct responses to figure, two background responses, and one perseveration. Thus improvement is noted in accuracy and lessened distractibility by background stimuli in the post-test results.

Tactual Motor Test (11-18-57)

S was unable to reproduce correctly a single design from the series of six shown him. He recognized the triangle, but in drawing it produced a long, blunted canoe-shaped figure, open at one end.

Marble Board Test (11-18-57)

Marble Board Designs 1 and 2 were reproduced in much the same manner, by filling in all adjacent holes. The drawings showed no understanding of the basic forms, being disconnected lines ranging over the entire page.

Vineland Social Maturity Scale

Pre-test (11-18-57)		Post-test (5-23-58)	
Total Score:	55.5	Total Score:	65
Age Equivalent:	4--9	Age Equivalent	7--0
Social Quotient	58	Social Quotient:	79

The mother served as informant at both interviews. She is a large "motherly" type of person, who seemed to have a very good understanding of S and his problems. S can do many things now that were quite beyond him at the beginning of the school year. He can now print quite well, although spelling is poor and must be constantly corrected. The table knife is used for cutting, and spreading. Baseball, follow the leader, cowboys and Indians, etc., are some of the pre-adolescent play activities in which he engages.

The mother feels that much progress was made by S this past year. Observation in the classroom during the Christmas party (11-23-58) corroborates this. S is very much a part of the group, and participates in classroom activities very well. Much of his shyness and awkwardness are no longer apparent.

Summary:

Improvement was noted on three of the five psychological tests on which there was pre- and post-tests for comparison. The post-test Stanford-Binet was ten points higher than the pre-test, which placed the intelligence level within the slow learning range. On the Syracuse Visual Figure Background Tests there was greater accuracy of form perception, and lessened distractibility by background stimuli. The post-test Vineland Social Maturity Scale resulted in a social quotient twenty-one points higher than the pre-test, showing that S's rate of social development had increased. Behavioral observations in the classroom situation corroborated this finding.

Performance on all other tests was uniformly poor. The Goodenough Intelligence Test mental age was exactly the same post-test, and there was one more error on the Bender Gestalt Test. The equivalent test ages on the Block Design and Coding subtests from the Wechsler Intelligence Scale for Children were the lowest possible. S was unable to perform on either Tactual Motor Test or Marble Board Test.

PEDIATRIC HISTORY C-2-10

The history was given by the boy's mother.

Problem:

C-2-10's biggest problem is said to be that of nervousness and tenseness and being high-strung. When he does try to work he doesn't seem to have the patience to follow through and feels the pressure of doing arithmetic problems and then is unable to complete a task. His reading is said to be good but when it comes to figuring, as in arithmetic, something seems to be wrong. However, he is said to have made quite a bit of improvement and it is felt that this is due, in large part, to his teacher who is said to handle him beautifully, (he is repeating first grade). He is made to bring home second grade work and mother works with him at home. She feels that he is making progress along these lines. Apparently there were no problems or outstanding trouble until he started school, except for convulsions which he has been having ever since the age of three years. These convulsions are onsided seizures which affect the arm, leg and face, he foams at the mouth, loses consciousness and is incontinent of urine. He is on Phenobarbital and unless he continues to take the Phenobarbital he has convulsions, the last convulsion having taken place as late as January 1957 when he was taken off the medication to see what would happen. The mother stated that she thought that C-2-10 might be on a tranquilizer; however, this will have to be checked with the physician. The mother stated that neither she nor the teachers are able to see any difference since he has been placed on what she feels is a tranquilizer It is apparently the difficulty at school, apart from the convulsions, which seem to be of greatest concern to the parents. The father and grandparents find it difficult to believe that C-2-10 is abnormal since they seem to think at home that they are unable to see any gross abnormal behavior. The mother is a rather tall, thin, blonde woman. We had the impression almost immediately that she had an accent and it turns out that she is of foreign extraction having come to the United States about ten years ago. However, she does have excellent control of the language. She spoke freely but seemed rather nervous and tense, tapping her feet and clasping and unclasping her hands.

Family History:

1. Maternal grandmother is living and well.
2. Maternal grandfather is living and well.
3. Paternal grandmother is living and well.
4. Paternal grandfather is living and well.
5. Mother has two sisters and one brother living and well.
6. Father is an only child.

Family Background:

Father: twenty-nine years of age and in good health, manager of a hardware store, (which is owned by parents). He finished high school. He was born and raised in this area.

Interests: golf, (little time for this actually since he works from 9:00 a.m. to 9:00 p.m.). He is very handy around the house and likes to putter around.

Personality: he is said to be tense and nervous and quite different from his father. Has to be on the move all the time.

Problems: He had difficulty in school as a child in that he did not want to go and played hooky quite a bit and it was not until he was discharged from the service, after serving two years, that he completed his high school education.

Attitude toward patient and his difficulty: he was very disappointed at first. He wanted him to be like the other children and at first would not hear of special education. He was upset when C-2-10 was put back to repeat the first year. However, now he realizes more of what is involved and seems to be more accepting of the idea of special education for the child. Since the father is quite busy he doesn't have too much time to spend with C-2-10. However, he has more time on Sunday but does not do too much with him. They are becoming closer now because they are able to play sports together.

Mother: thirty-two years of age, in good health. Born and raised outside the U.S. where she was educated and completed the equivalent of high school. After she left her homeland, she came to this area.

Interests: sewing and sports. Presently she works part time as a receptionist while C-2-10 is in school. (She felt that she didn't have enough to do at home.)

Personality: the mother described herself as nervous and has to be doing something most of the time. She said that she wishes she could relax and that she gets upset quite easily with C-2-10.

Attitude: at first, she was scared and upset by the convulsions. She was then unhappy with the knowledge that he would need special education. However, she prefers the latter to his being kept back and having to repeat a year, feeling that this way he is not keeping up with his peers. She feels that perhaps with special education he will catch up.

Marriage: the parents have been married for nine years. A fairly compatible marriage. There is a difference of religion, the child taking the same religion as the father. However, there does not seem to be any real difference or difficulty on that score. The parents have always lived with their in-laws and this has been somewhat of a problem, (the mother added that this is as would be expected in any family) even though the in-laws do not apparently meddle too much in the raising of C-2-10.

Grandmother: fifty-three years of age, hard-working woman who still works in the hardware store.

Grandfather: fifty-four years of age. Grandfather is very close to C-2-10 and loves him very much. The mother stated that her in-laws feel that she is spoiling C-2-10; however, there is no real friction between them. The mother did say that there was some interference with the raising of the child.

Siblings: C-2-10 has no brothers or sisters. The mother expressed the wish that he had. There is a dog who, at first, did not get along too well with C-2-10 and vice versa; however, they are doing better now.

Mother's medical history during pregnancy with child:

The mother was twenty-four years of age at the time she delivered C-2-10. He was a desired pregnancy. He was born in the mother's homeland. After becoming pregnant, the mother had a desire to see her parents, feeling that afterward it would be practically impossible for her to return. The father felt the same way and it was agreed that she would return there while she was pregnant. She made the trip when five months pregnant and remained separated from her husband for about eight or nine months. The in-laws apparently did not object to this either. The pregnancy itself was completely uneventful, no illnesses, no x-rays, no medicines were taken. She entered the hospital one week prior to the expected date of delivery for a blood transfusion. However, she never did receive the blood transfusion and labor was induced artificially, was prolonged apparently and anesthesia was given so

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that the mother described the delivery as "pretty rough". C-2-10 was seen within the first twenty-four hours. His birth beight was six pounds, four ounces and he was nineteen inches long. He was breast fed for about the first three months with supplemental bottle feedings. However, the mother developed a breast abcess and so he was weaned from the breast at about that time. He remained in the hospital for two weeks after the mother left. The reason for this was that he had developed an infection of his naval (without jaundice) Mother and child returned to the States when C-2-10 was four-and-a-half months old.

Past History:

DPT and smallpox vaccination during first year of life. B.C.C. Polio immunizations. Infection of naval at about two weeks of age. Measles at about three-and-a-half years of age. A T & A at five-and-a-half. His first convulsions seemed to have been associated with fever. Convulsions are said to occur just before he actually goes to sleep and while he is in bed. When he was four he had four teeth extracted under anaesthesia. He apparently had a rough time of this because he awakened screaming and was frightened and upset.

Developmental History:

C-2-10 nursed well, had no trouble swallowing and is said to have shown temper at three months of age because when he was hungry he would bite his mother (apparently teethed quite early). . .He was weaned from the breast at three months of age and from the bottle at one year of age. He was a thumb-sucker but did not rock. Solids were started at two months of age. He never had any difficulty with his sleeping habits, no history of pica (swallowed pennies and marbles though). He started to walk at twelve months of age and was walking alone at fourteen months of age. He teethed early. He was a late talker but once he started he apparently spoke well. He held a spoon and a glass quite early. His toilet training was begun at six or seven months of age and completed by two years of age. He was enuretic up until five-and-a-half or six when an apparatus consisting of a bell was used and apparently was successful in breaking him of this habit. He was unable to count up until the time he started kindergarten. He is right-handed (father is left-handed and maternal grandmother is ambidextrous). There was never any difficulty with vision or hearing. His attention span is poor and he has a lack of patience.

Present Conditions:

C-2-10 is on Phenobarbital, takes his medicine OK and by himself, wants to be like everyone else. He has asked about his being put back in school and is said to have expressed a desire not to leave the regular school because he wants to be with his friends, (I wonder if this isn't the way the parents themselves feel about the problem). He is said to be able to dress himself, he can tie his shoes, combs his hair and bathes himself. He uses a spoon and fork OK but is not too handy with a knife.

Interests:

He draws and colors very well and likes to do this. He likes to play with children but is content when he is by himself. He has friends, some of whom are his own age and some are older. He gets upset easily when others criticize his work. He is able to ride a two-wheeler bicycle and doesn't do too well with building-type of games or activities unless someone else is around to help. He can drive nails into wood but is unable to make anything useful by this type of procedure. He likes to play ball and apparently can (is said to have good coordination). He goes to Sunday school, he sits through television and movies. Punishment consists of spanking, threatening and rewards. His response to any and all of them is to get mad and sulk. At first he was unable to fight. He used to come home crying and was overprotected by mother. However, now he will hit back when attacked. When frustrated he cries and gets upset but no real temper tantrums.

Physical Examination: Blood pressure 90/50

General appearance: C-2-10 is a pleasant looking child who was neatly dressed and came along with the Examiner willingly. He was able to state his age and that he likes reading most at school. It was noted that he spoke with a hoarse voice. His speech was adequate but he did not seem too alert. A good mommy "is a good cook and baker". A bad mommy "doesn't give any food - she doesn't like the boy who is bad but 'my mommy is playing too much'". His three wishes included games like crocket, baseball and football. He says he never dreams. He gave an inadequate response to the elephant story and the baby bird "would die or get hurt - when people die they go to Heavan". The child wore a wristwatch and was able to tell time. He recognized a penny and a nickel but did not know how many of the former were in the latter. He was very fidgety and, although not particularly hyperactive, seemed rather uncomfortable. He undressed rather sloppily, leaving his clothes where they fell. He didn't button the buttons too well and was unable to undo the cufflinks.

C-2-10 is rather skinny with his thorax prominent. He has a hemangioma on the inner aspect of his right arm. He is able to hop on each foot but cannot skip. His teeth numbered ten on top and ten on bottom. Reflexes were easily elicited and equal in all four extremities. In getting dressed he had some difficulty with his shirt buttons.

Skin and mucous membranes: not remarkable. Lymph Nodes: not remarkable. Head: not remarkable. Face: not remarkable. Ears: not remarkable. Eyes: not remarkable. Nose and sinuses: not remarkable. Mouth and throat: not remarkable. Neck: not remarkable. Vertebra: not remarkable. Chest: not remarkable. Abdomen: not remarkable. Genitalia: not remarkable. Extremities: not remarkable. Neurological examination: not remarkable.

Neurological Examination: Cranial Nerves - first cranial nerve was not tested. Second cranial nerve - visual fields are grossly intact by con frontation. Fundi are normal. Third, fourth and sixth cranial nerves - pupils are round and equal and react to light and accommodation. Extra ocular movements are intact. No nystagmus is present. Fifth cranial nerve - motor and sensory powers are normal. Seventh cranial nerve - taste was not tested. Muscles of facial expression are normal. Eighth cranial nerve - the tuning fork and spoken voice were heard without difficulty. Air conduction is greater than bone conduction. Ninth and tenth cranial nerves. The uvula goes up in the midline. Phonation seems to be normal. Eleventh cranial nerve is normal. Twelfth cranial nerve - the tongue protrudes in the midline. There is no sign of atrophy or fasciculations.

Sensory - pin prick, touch, position, vibratory senses are all normal. Two point discrimination and pin prick localization were well performed. Stereognosis is normal. Reflexes are equal and active throughout. No pathological reflexes are present. Motor - boy shows good strength throughout. Muscle tone is normal. Cerebellar - finger to nose and heel to shin tests were fairly well performed. There is some difficulty with diadochocinesis on both sides. He had a great deal of difficulty in spinning the jack. Fine movements seemed to be rather awkward for this boy. Station and gait - Romberg is negative. He is able to walk on his heels with some difficulty. He can walk on his toes without any difficulty. Normal gait. Movements - no extrapyramidal movements were seen.

Comment: The diamond he attempted to draw he could not draw. As soon as he drew it he said, "I know that isn't right. I don't know how to draw a diamond." He seemed to recognize the fact that the thing is wrong. Most peopl who have organic damage of the type who have difficulty with angles usually do not recognize the fact that they are having difficulty with the angles. The boy seemed to be upset that he could not spin the jack and that he could not draw things correctly. His house is somewhat different in that he drew a round roof on it.

Electroencephalogram: Attitude and condition of patient - alert, cooperative. Fundamental frequency - ranges around 8 waves per second. Slow waves - isolated and short sequences of 200 to 300 millisecond waves dominates the record; at times 100 millisecond biphasic spike-like discharges are prominent, particularly over the left brain. Fast waves - are not prominent. Amplitude characteristics - high voltage (100 to 150 microvolts); irregular modulation. Hyperventilation - accentuates the prominence of the spike-like output. During a prolonged series of spike-activity the patient was seen to engage in an automatic type of pulsion movement of the extremities. Impressions: generalized abnormal electroencephalogram. Right-left orientation disturbed. Double simultaneous testing - unable to resolve any pairs of stimuli.

Psychiatric Evaluation: C-2-10 is truly hyperactive, both in the playroom and with his mother, though somewhat more so in the latter situation. He groaned about going to the playroom for an hour, "that's sixty minutes, isn't it?", but once there was loathe to stop at the end of this time. He singled out the Play-Do immediately and said, "I want to work with clay". He asked the Examiner to do something "hard, like a horse", but back away from the joking reply that he try something hard also. The Examiner's, he said, was not goind to turn out too well because clay work was not as easy for her as other things. He was asked the Despert baby bird fable and he replied that "the baby would stay on the tree without the nest. . . even though the mother and father bird flew somewhere else". As to the elephant story, Jimmy first described the elephant as having big eyes, big tail, big tummy, big nose, etc., but was unable to say that the nose or trunk was bigger than any other part of his body. In reply to the question, "what is different about the elephant?" he smiled stating "it was all torn up - by another little boy - no, he was not a friend".

Jimmy sat still for the entire hour, turning from the clay to crayon drawing. He drew first a house with brown color, followed by another house on a separate sheet of paper, then a rabbit, a tree, and his signature. He was very proud of this last drawing. He drew their dog, and on the Draw-a-Man test, at the very bottom of the page, he drew a small, bizarre head and body resembling that of a dog which he described as a "baby". For several of these drawings it was important that the Examiner not look at his drawing. He would ask certain questions about the drawing, "do you think the house door is five or six inches high? But don't look now, remember". It was evident that this hour was a test situation for him because he asked more than once "is this the last time I have to come for tests?".

He denied bad or good dreams.

He had the ability to count to twelve but could not use these figures in any meaningful way. Likewise, he was disoriented for time, although he did remember his birthdate.

His speech was not remarkable except to describe it as fast and rather high-pitched. The speech difficulties, such as they were, appeared to indicate careless speech rather than gross immaturity.

After the Examiner called Bobo and the punching bag to the boy's attention, he was more than enthusiastic to hit them. He gave good right blows to both Bobo and the bag which continued in a furious and vigorous fashion for about five minutes. He returned abruptly to his crayon drawing without registering verbally how he liked it or why he had stopped. His coordination was within normal limits and he evidenced good muscular strength throughout.

We wound up the hour vigorously rolling toy cars and trucks headlong into one another, the harder and faster the better. However, he was able to control his enthusiasm and after one sentence to prepare him that the end of the hour was approaching, he was able to leave once he had made small "quick drawing".

Comment: Observation of mother-child interaction shows that his mother is constantly after him to behave as though he were a much older boy. He is hyperactive and has a short attention span. While his alertness and bood spirits may be deceptive, it is the opinion of the Examiner that his potential intellectual functioning is higher than the reported one.

Psychiatric Re-Evaluation: C-2-10 was his usual very active, friendly self. He had been spending the summer at camp and has had many opportunities in which to achieve, and has allegedly done so. His mother stated, "this has been better than anything else for him . . . it has been wonderful".

In the playroom he first gave the training boxer a good work-out and then turned to the punching bag. He seemed eager to use every moment and did not wish to waste any of the minutes available for spontaneous behavior.

Once again he was unwilling to commit himself to answer any of the Despert Fables and he remained silent. However, he was much more spontaneous in his movements and in his responses to the Examiner's questions; in fact it was hard to stop his verbalizations about what fun it was to be at camp.

He was most cooperative when asked to do some drawing. He started by creating partial diagonals and squares, each of which he colored in various fashions. He was less interested in drawing a person and chose to picture a house in which he put ten windows. Nine windows had crossbars and one had diagonal window sections.

C-2-10 appears to have gained tremendously in the realm of social interaction. He gave no indication of any problems in getting along with his peers and/or his academic work. He was not interested in his academic performance and talked very little about this except to say that he had not liked his "bossy" teacher. The striking features about this interview were his apparent self-confidence, and his willingness to talk in detail about his family and his school life.

Conversation with mother: The mother exhibited a certain detachment. She did not in any way communicate the atmosphere of their home. She felt that her child profited a great deal from summer camp. There was some concern on her part about the child's change of classrooms. She wondered why he was being moved. Following a discussion informing her that much was gained through such a placement, she was satisfied that her son was in a good position this year becasue of what was learned about him during the past year.

Comment: C-2-10 appears to have gained considerably in self-confidence, but he continues to reflect an apparent lack of insight into his learning difficulties. He presents himself as a child who has no problems.

Stanford-Binet, Form L (Pre-test) (5-24-57)

C.A.: 8--0
M.A.: 5--5
I.Q.: 68

Intelligence is within the Retarded range with the mental age being two and one half years below the chronological age. The Basal Age is at Year IV, while the Ceiling is at Year VII. The results of this psychological examination are in close agreement with the psychological testing done 11-15-55, when a WISC was administered and a Full Scale I.Q. of 64 was obtained. On the same instrument a Verbal I.Q. of 72 and Performance I.Q. of 61 were obtained.

At Year IV-6 all items were passed with the exception of materials. To pass this item a child must be able to identify correctly the materials of which several common objects are made, such as a chair, dress, and shoe. Giving the materials of which familiar objects are made involves language comprehension and information. S correctly identified the material of which a chair is made, but could not tell the materials involved in a dress or shoe. At the conclusion of the test direct questions were asked. When asked what his shirt was made of he said: "Paper." When asked what his shoes were made of he said "Wood."

At Year V two items were failed. S was unable to copy a square. This test requires an appreciation of spatial relationships and the ability to make use of visual perception to guide a complex set of motor coordinations. He was also unable to remember a sentence at this age level. Thus two areas of weakness can be seen: perceptual activities requiring visuo-motor coordination, and immediate memory span.

At Year VI two items were failed. Vocabulary was not passed at this level, only four words being correctly defined when five are required. The vocabulary responses indicate a paucity of well-developed verbal concepts. His definitions were very concrete. Comprehension was very poor. For example, when asked to define eyelash, he said: "it lights." After the conclusion of testing he was asked if he had an eyelash. He said: "Yes, in our basement." Further questioning did not elicit further elaboration. When asked to define roar he said: "Chocolate pudding." He could not elaborate on this. He was also unable to pass the mutilated pictures item. In this test item the child must choose from the given parts of a whole the missing parts. This also involves choosing the essential from the nonessential of a meaningful, structured situation.

At Year VII all items were failed. He was unable to see the absurdity of situations presented pictorially. Again, this involves seeing the essential meaningful elements. When he was shown a picture of a man sawing wood with the saw turned upside down, he said: "He's sawing wood." When asked what was foolish about it he said: "Because he has to." When shown a picture of a dog chasing a rabbit but running in the wrong direction, he said: "The rabbit's difficult for him." When asked what he should do if another boy hit him without meaning to do so, he replied: "Hit him back." Abstract ability, as involved in opposite analoies and similarities between two things, were also failed, as was repeating five digits. He was unable to draw a diamond.

Stanford-Binet, Form M (Post-test) (5-22-58)

C.A.: 9--0
M.A.: 7--0
I.Q.: 78

The I.Q. on the post-test is ten points higher than that obtained on the pre-test, which places the level of intelligence within the Slow Learning range. The four year performance range is from a Basal Age at Year VI to a Ceiling at Year IX.

At Year VIII S could see opposite analogies, comprehend problem situations, and tell what day preceeded certain given days in the week. He was unable to see the similarity between two things, or absurdities in verbally described situations.

All itmes were failed at Year IX.

Ammons Full Range Picture Vocabulary Test (11-27-57)

The mental age obtained on this test is very close to that obtained on the Stanford-Binet. A number of words, expected successes at this chronological age level, were failed: vegetable, phonograph, customer, sale, island, laundry, manufacturing, cheerful, collision, listening, broadcast, uniform, cleanliness, and intersection.

Goodenough Intelligence Test

Pre-test (5-24-57)	Post-test (5-12-58)
C.A.: 8--0	C.A.: 8--11
M.A.: 4--6	M.A.: 7--0

The pre-test drawing is extremely crude, being constructed of spidery lines, barely recognizable as an attempt to draw the human form. Post-test is much better, although still very poor. The latter is two dimensional, with hair, and eyes with pupils.

Block Design and Coding from WISC

	Raw Score	Scaled Score	Equivalent Test Age
Block Design	4	6	5--2
Coding	15	5	6--6

The first design was reproduced accurately on the first attempt, Design B and C on the second, and S was unable to progress beyond this point. His first attempt to reproduce Design B was a perseveration of the preceding design. Seventeen substitutions were attempted on the Coding Test Form B, with two errors.

Bender Gestalt Test

The pre-test drawings (5-24-57) were rather firm and definite, but a fair number of deviations occurred which were categorized as errors. There were two perseverations, three dissociations, three incorrect elements, two distorted angles, two rotations, and one disproportion, which totals 13 errors. Post-test (5-12-58) 12 errors were made, one concrete, one perseveration, three dissociations, three incorrect elements, three distorted angles, and one compression. Thus, in terms of over-all performance, there was practically no change between the tests given at the beginning and those at the end.

Syracuse Visual Figure Background Test

Pre-test (11-18-57) there were six correct responses to the figure, four background responses, and no perseverations. Post-test (5-12-58) there were nine correct responses to the figures, six background responses, and, again, no perseverations. Thus, while there was a slight increase in accuracy, there was also evidenced a somewhat greater distractibility by background stimuli.

Tactual Motor Test (11-18-57)

S was unable to reproduce correctly a single design from this test. After feeling the diamond, which is the easiest figure in the series, S proceeded to draw a square. With the addition of a thumb-tack background S became even more confused, and procdeded to draw only the background.

Marble Board Test

Design 1 was started in the extreme upper left hand corner of the board, and the first side of the figure contained the correct number of marbles. The next side had additions, however, and S was unable to resolve this error. He was aware of the inaccuracy of his reproduction, as may be inferred from his comments: "I'm getting all mixed up. . .how many do I have right?" He attempted to count the marbles, but this did not resolve the problem. His drawing of the design shows two squares, one directly on top of the other.

Design 2 was started correctly, but S was unable to make the diagonal lines required. After many errors, he said: "That don't look like it," but was unable to improve his reproduction. When he attempted to draw the figure, he produced two dissociated rectangles.

Vineland Social Maturity Scale

Pre-test (11-22-57)		Post-test (5-13-58)	
Total Score:	74	Total Score:	74
Age Equivalent:	9--0	Age Equivalent:	8--11
Social Quotient:	106	Social Quotient:	100

There is very little change in the rate of development of this boy's skills and abilities as shown on this instrument. The major skills that seem to be emerging at the present time are an increased desire and ability to participate in preadolescent play activities, and a beginning use of tools and utensils. His father in encouraging him in this latter activity.

Summary:

The level of functioning intelligence was in the Slow Learning Range at the end of the academic year. On three of the five tests on which there was a pre-test and post-test for comparative purposes improvement was noted

(on the Stanford-Binet, Goodenough Intelligence Test, and Syracuse Visual Figure Background Test). . .On this latter test, while improvement was noted in accuracy, a slight tendency toward greater distractivility by background stimuli was also noted. Practically no change was noted on the Bender Gestalt Test or the Vineland Scale of Social Maturity.

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